

The MINING CONGRESS JOURNAL

Volume 9

APRIL, 1923

Number 4



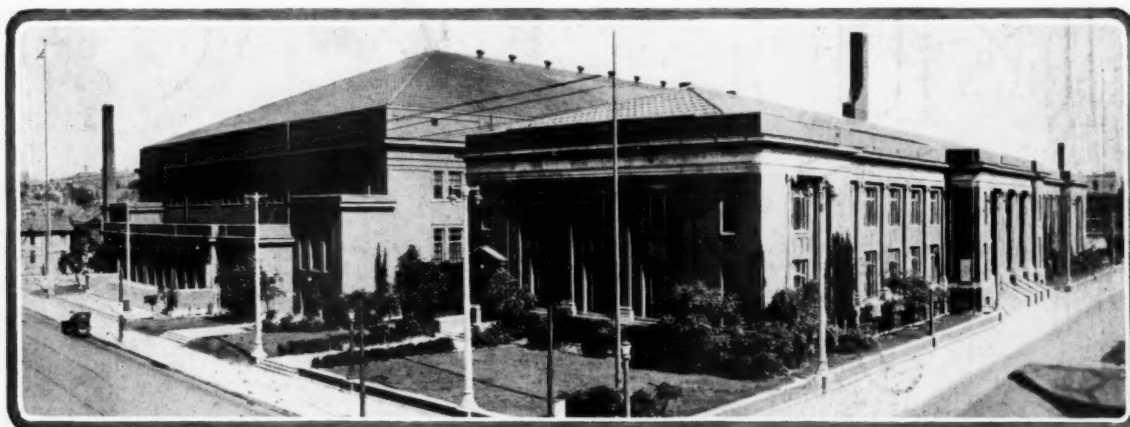
Standardization Number

Reduction of costs is vital to profitable mining. How standardization is coming into service as a means toward that end is outlined in the articles written for this issue by authorities.

Some of these articles analyze the application of standardization to specific phases of mining operations, while others deal with the subject in the more general terms of its possibilities and practicalities.

✻

THE Twenty-Sixth Annual Convention of The American Mining Congress and National Exposition of Mines and Mining Equipment, Milwaukee Auditorium, Milwaukee, Wis., September 24-29, 1923.



THE 1923 PROGRAM

EACH YEAR for twenty-five years the American Mining Congress has gathered together the leaders in the mining industry, discussed the needs of that industry, adopted a general platform in its behalf, and, to a large extent, carried it out. Each year has seen a betterment in mining conditions, and a growth in value of mineral products from \$650,000,000 in 1897 to \$4,056,000,000 in 1921.

The 26th Annual Convention, to be held in Milwaukee, September 24th to 29th, will lay before the mining men of the United States the most constructive platform ever presented for the entire mining industry.

The keynote of the 26th Annual Convention will be "Industrial Cooperation." The problem of securing a solution of the relationship of labor and capital is one of the most vital issues confronting the mining industry of the nation.

A modification of the Sherman law to allow cooperative combinations in the production and distribution of mining products is another subject which should receive consideration.

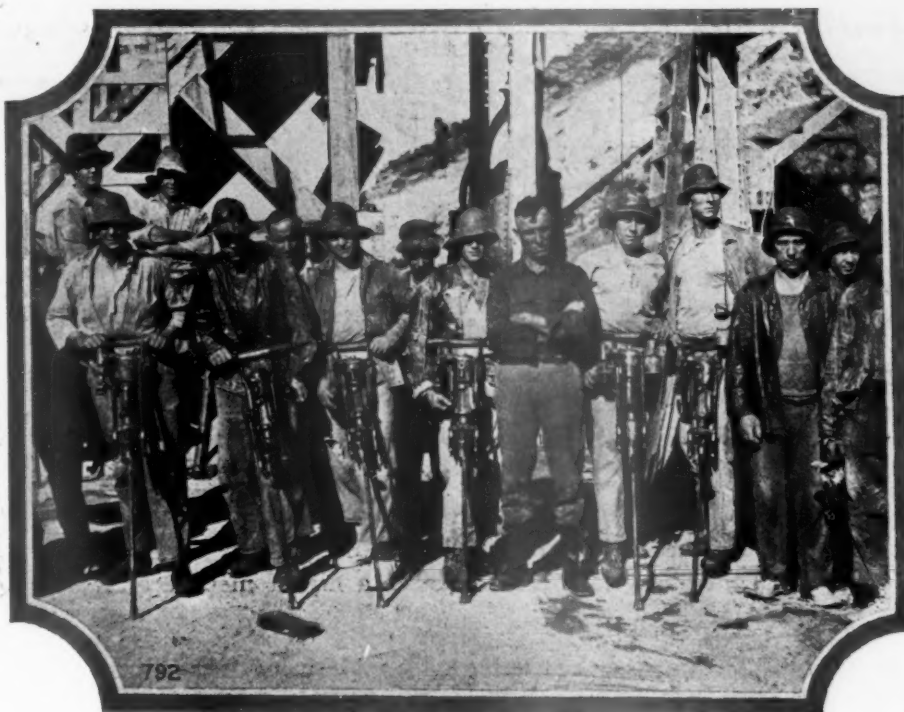
The problems of the coal industry cannot be solved by legislation nor by governmental interference. Only by the intelligent unhampered cooperation of those who understand coal will any solution of coal problems be possible. Such men will recognize the right of the miner to a fair wage, the right of the public to cheap fuel, and an intelligent public will concede their right to a fair profit.

The American Mining Congress has already gone on record in favor of a reduction in freight rates upon basic commodities which must first move before the many products fabricated therefrom can add to the income of railroads and meet the demands of commerce and industry.

The work of the Standardization Division of the American Mining Congress will bring together the operator, engineer, mine superintendent, and manufacturer in practical discussion of the every day problems and efficient production.

The 26th Annual Convention of the American Mining Congress at Milwaukee will furnish opportunity for the development of practical, definite, crystallized plans of action for the industry as a whole to the end that it may furnish a supply of these basic products necessary to the continued industrial prosperity of the nation.

THE AMERICAN MINING CONGRESS.

"The Waugh Way Wins"

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FOURTEEN hundred feet of six-compartment shaft, (12 ft., 4 in., by 16 ft., 8 in., in the clear), completed in less than ten months, and 209 feet of this completed in 28 days, is the new and remarkable record established by these husky boys of shaft-contractor Jack Harrington's, at the Inspiration Copper Company, Miami, Arizona.

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THE MINING CONGRESS JOURNAL

APRIL, 1923

CONTENTS

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Illustrations	Page		Page
Samuel D. Nicholson.....	108	Is Standardization Possible?—By C. H. Mathews.....	131
William Conibear.....	120	The Value of Standardization In Mining—By Lucien Eaton	134
Cliffs Shaft Mine.....	121		
Modern Steel Fan.....	124	News	
Inefficient Wooden Fan.....	125	Minerals Separation Arguments Concluded.....	107
C. H. Mathews.....	131	Senator Samuel D. Nicholson Dies.....	108
Pittsburgh Station, Bureau of Mines.....	136	Immigration Quotas Almost Filled.....	109
Bureau of Standards Grounds.....	137	Rescue Meet to be Held in Salt Lake City.....	110
		Coal Commission Takes on New Life.....	110
Editorials		Industrial Leaders to Discuss Cooperation.....	111
A Farce in Government.....	103	The Progress of Standardization.....	111
Railroad Prosperity.....	103	Tax Returns Mirror Business Revival.....	112
Is It Wise?	104	Export Coal Trade is Reviewed.....	112
Publicity in Coal.....	104	Cost Data Right Denied by Court.....	114
Consolidation of Railroads.....	105	Major Coal Studies Bulletined.....	114
The Merchant Marine.....	105	Utah Chapter Elects New Officers.....	114
Blocs	105	Burton Bunch Resigns.....	116
The Facts About Coal.....	106	Tax Statistics Indicate Discrimination.....	119
		Current Oil Shale Bibliography	122
Feature Articles		Plans to Develop Sutro Tunnel.....	128
Our Coal Labor Problem—By George Cushing.....	113	Consular Reports Show Silver Status.....	130
Formulation and Adoption of Industrial Standards—By Col. Warren R. Roberts.....	115	Increased Leasing Work Brings Changes.....	133
Practical Problem of Standardization for the Metal Mining Industry—By Charles A. Mitke.....	117	Mining Bureau Aids in Movement.....	136
Standardizing Metal Mine Fire Equipment—By William Conibear	120	War Minerals Relief Cases Decided	136
In Washington Town—By Ira L. Smith.....	123	Bureau of Standards Performs Yeoman Service.....	137
The Value of Improving Mine Ventilation—By Carl H. Trik	124	Outlines Views on Coal Situation.....	137
The Future of the Standardization Movement—By Wm. B. Daly.....	126	National Legislation.....	138
How the "Hoover Process" Reduces Mining Costs—By Ray M. Hudson	129	Patents	142
		Industrial Notes.....	142
		Personals	142
		Statement of Ownership	142

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OVER six years ago, the Byers Company conducted experiments which showed conclusively that Byers Genuine Wrought Iron Pipe was capable of being Van Stoned. But the proper equipment was lacking for doing the work on a commercial basis.

Enterprising pipe fabricators, who for some time had been cognizant of these facts, then undertook to design and construct such equipment.

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Sivyer Chrome Electric Furnace Steel Representative Properties —Annealed Castings.

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Elastic Limit.....50,000 "
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Reduction in Area.....24%

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THOROUGH tests convinced the manufacturer of an automatic shoveling machine for mines that the front shovel section did not have the tensile strength and resistance to wear required by his exacting standards of quality. If he had continued to use ordinary steel for this part, he would have had to thicken the sections. This, in turn, would have made it necessary to redesign the machine throughout in order to take care of the increased weight of this pivoting part—and the machine was already as bulky as service conditions permitted. He investigated the possibilities of Sivyer Electric Alloys and found that by using Sivyer Hi Carbon Steel the desired tensile strength and resistance to wear could be provided without any change in the original sections.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE



Back of the Unmined Mountains of Coal

In an industry that has doubled its production capacity every ten years since its inception, Westinghouse has more than kept pace with progress. Coal mining methods of today show vast improvement over those of fifty or even ten years ago.

Ahead lies the future with its immeasurable job of claiming the yet unmined mountains of coal. And if coal, as a fuel, is to maintain its place in industry, greater still must be the improvements in methods of production—coal costs at the mine must come down.

Back of the coal men who are striving to maintain lower production costs is the tremendous Westinghouse organization, with its research, engineering, manufacturing and maintenance resources. As in the past, Westinghouse electrical equipment will solve many production problems of the future.

WESTINGHOUSE MINE SERVICE STATIONS

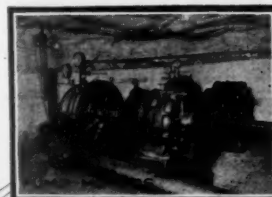
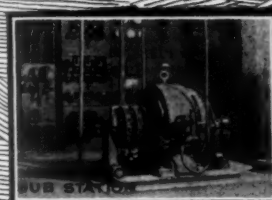
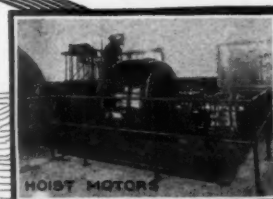
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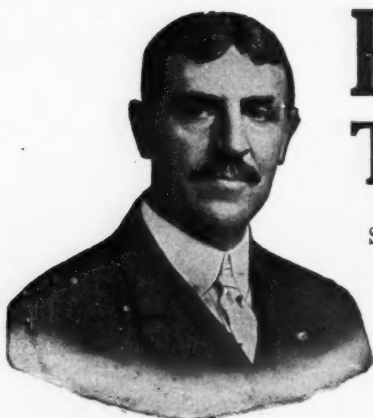
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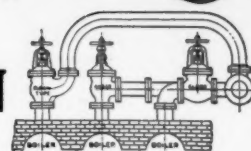


CHARLES E. GOLDEN
President and General Manager

ENGINEERS Think This Over

Mr. Golden says: "Don't be content with Pop Safety Valves. In the event of a ruptured boiler tube or steam pipe they are useless to control the rush of steam from all your boilers through the break. Think of the chance you take in not preventing this possibility."

The big iron and steel plants, realizing the importance of protection against this danger of shutdown and disaster, have installed.



4100 GOLDEN-ANDERSON Life and Property Insurance Valves

"Every Valve with a Positive Guarantee"

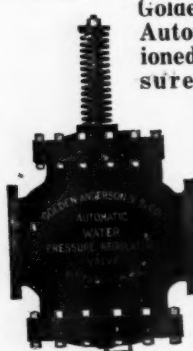
"Hosts of References"

"Double Extra Heavy Valves"

"No Shut-Down When a Tube Bursts"

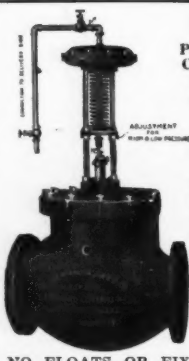
1. Automatically cut out a boiler the instant that a tube ruptures or other internal break occurs.
2. Automatically cut off the steam flow from every boiler the instant that a steam pipe bursts.
3. Automatically equalize the pressure between all boilers.
4. Automatically cut in a boiler, making accidents due to inaccurate steam gage impossible.

5. Positively prevent backflow of steam into a cold boiler.
6. Can be closed by hand, like ordinary stop valve, and arranged with "combination feature" to open valve like regular gate or globe valve.
7. Can be tested in service from the boiler room floor.
8. Double Corliss Dash Pot that cushions in opening and closing.
9. Cannot pound, spin, stick or chatter.



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Altitude
Controlling
Valves

Three ways of closing: automatically by water, electrically from distant points and by hand. Sizes to 30 in.



NO FLOATS OR FIXTURES

**GOLDEN-ANDERSON
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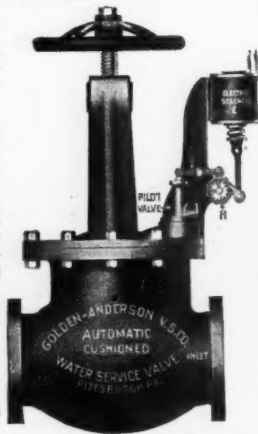
Will positively keep water level between two fixed heights. Cushioned against shock. Fitted with swiveling float arm. Angle or Globe up to 30 in.



Angle or Globe up to 24 in.

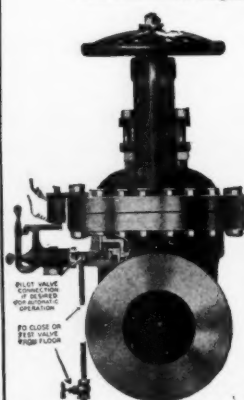
**GOLDEN-ANDERSON
Patent Cushioned Water Service Valves**

1. These valves are especially designed for fire protection to quickly build up full water pressure.
2. Can be opened and closed instantly from distant points by electricity.
3. Current is on only a few seconds thereby preventing waste.
4. Can be fitted with either d. c. or a. c. solenoid.
5. Perfectly cushioned by water and air. Positively metal-to-metal seating.
6. Can be closed by hand.



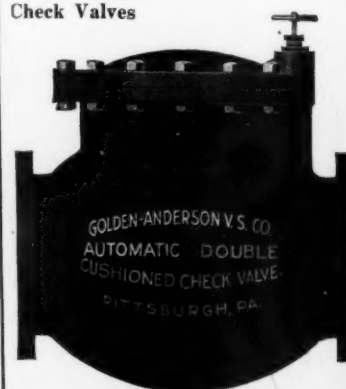
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Pat. Cushioned Combine Throttle
and Automatic Engine Stop Valves

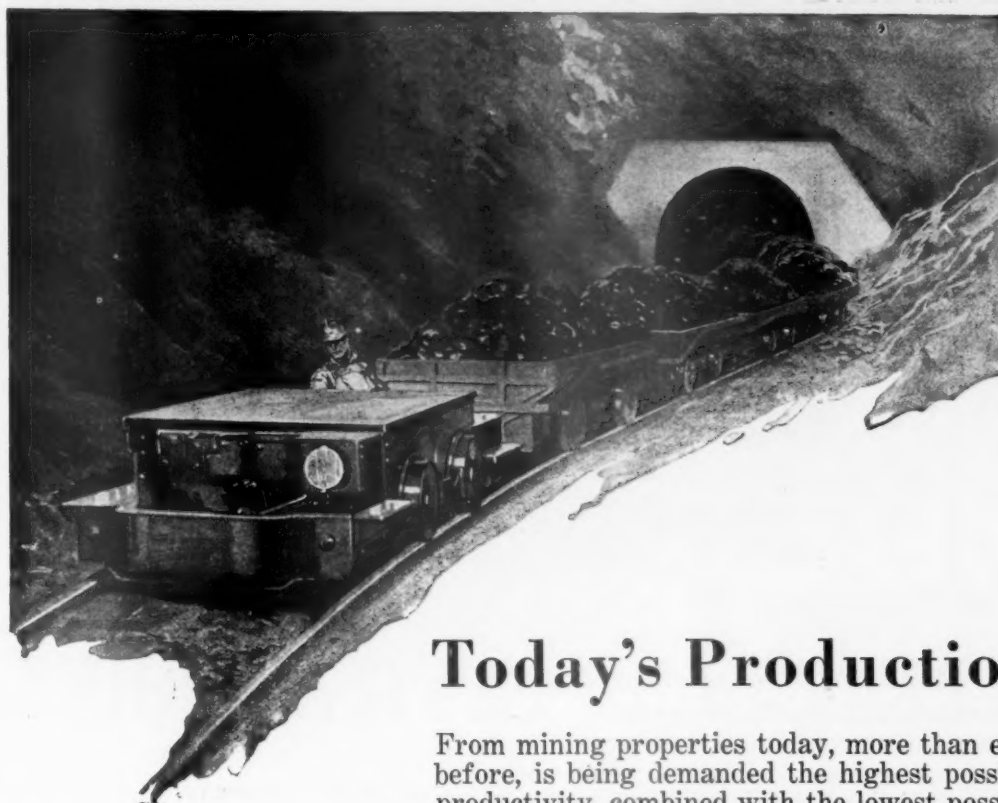


- 1—Can be operated by electricity from distant points, insuring instant checking of steam to runaway engine, or any part of the entire plant piping system.
- 2—Equipped with double Corliss Dash Pots. No chattering, pounding or sticking is possible.
- 3—Double extra heavy construction; occupy minimum head room.
- 4—Sizes up to 20 inches.

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From mining properties today, more than ever before, is being demanded the highest possible productivity, combined with the lowest possible operating costs.

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The life of mine car wheels must be lengthened—air compressor trouble must be eliminated—electric locomotive hot boxes must be avoided, and coal cutting machinery must work to full capacity day after day.

Wherever the importance of proper lubrication is taken into consideration, Keystone Grease has always ably demonstrated its greater efficiency by day-in-day-out service—its superior lubricating qualities have long been recognized throughout the entire mining industry.

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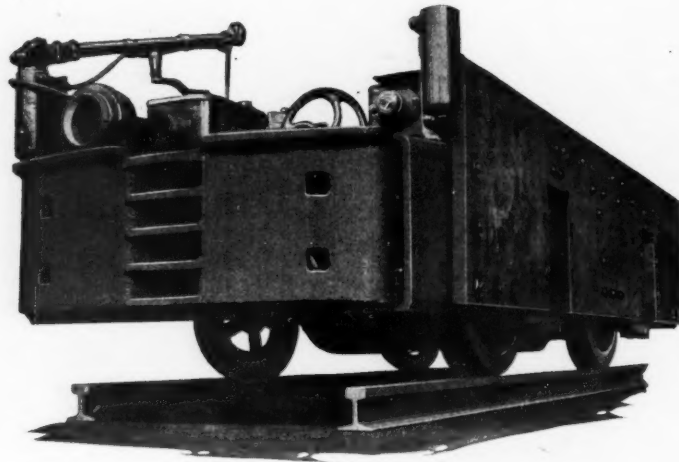
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CLEARANCE=A VITAL POINT

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And if a Goodman locomotive does get off the track, its ample clearance beneath the sideplates makes re-railing easy.

(29)

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It is a theory of ours that nothing is too good for the mines and we have tried hard to interpret this ideal through every O-B



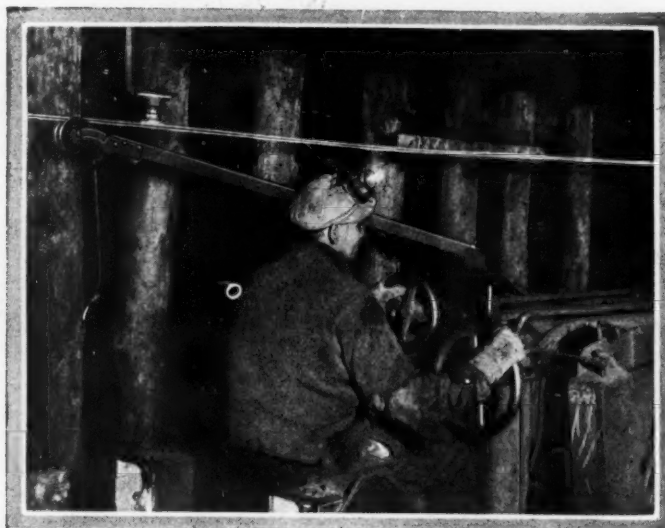
Product. Evidently there are a lot of mining men who like the idea. At any rate we manage to find plenty to do every day and sometimes you will find us around on Sunday.

O-B Mine Haulage Material Includes:

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| Trolley Hangers | Feeder Wire Insulators |
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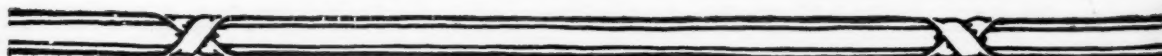
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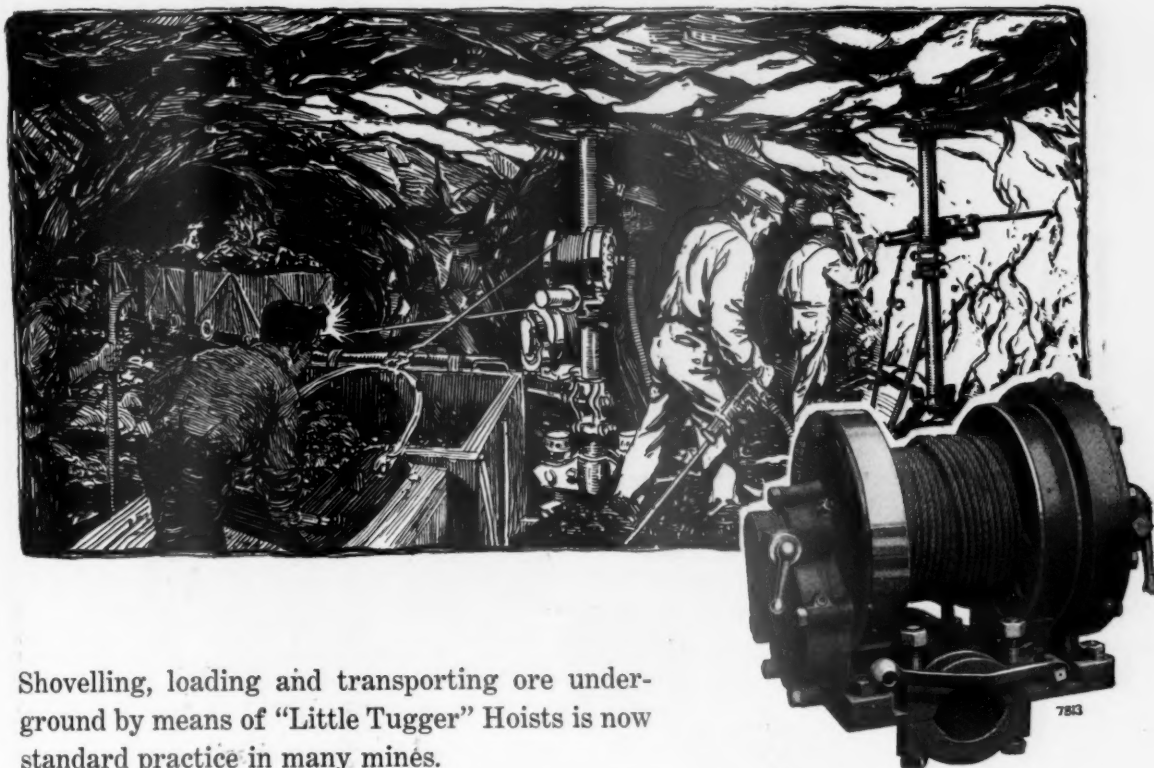
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The immediate result is increased output at a lower cost with higher wages for the men. All this may be done with the original mine layout.

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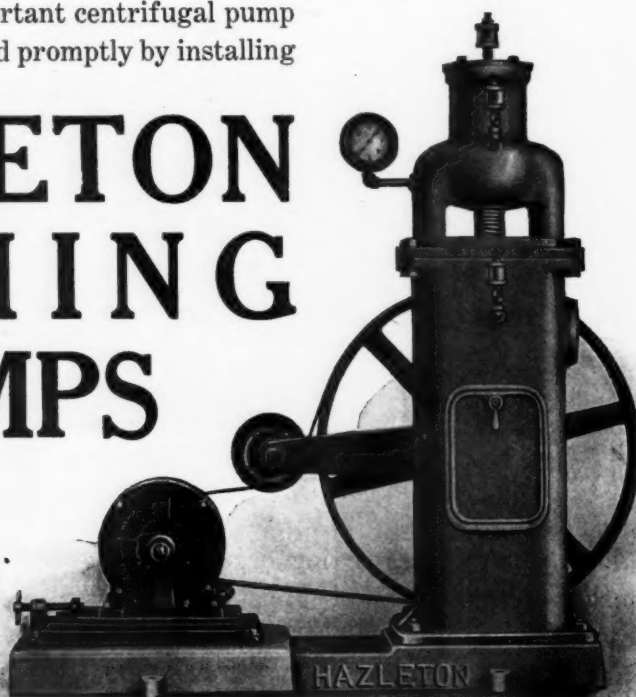
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A mine's revenues are
based on tonnage.
Big fortunes are lost
thru inaccuracy.
Continuous losses thru
error are inexcusable.

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ELIMINATE
THE HUMAN ELEMENT OF ERROR

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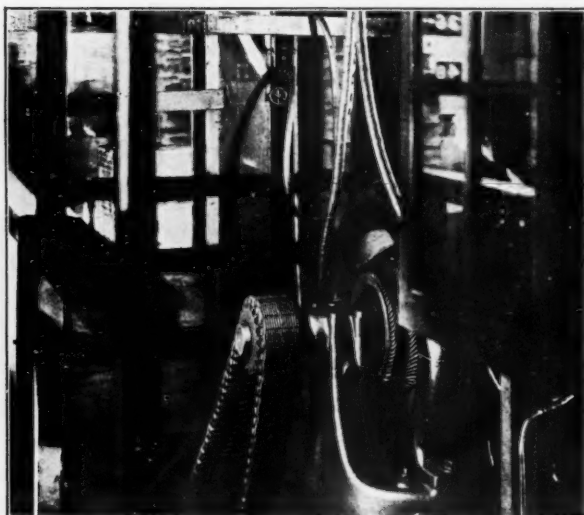
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"By using a Morse Silent Chain Drive we have totally eliminated slippage—so common with other drives, thus preventing the loss of power and production. Also with the Morse Chains, we drive direct—no line shaftings to take up space and cost additional money.

"During the entire time we have used Morse Silent Chain Drives we can conscientiously say that they have been no bother nor trouble in any way, and they are compact—nothing clumsy and inconvenient about these chain drives."

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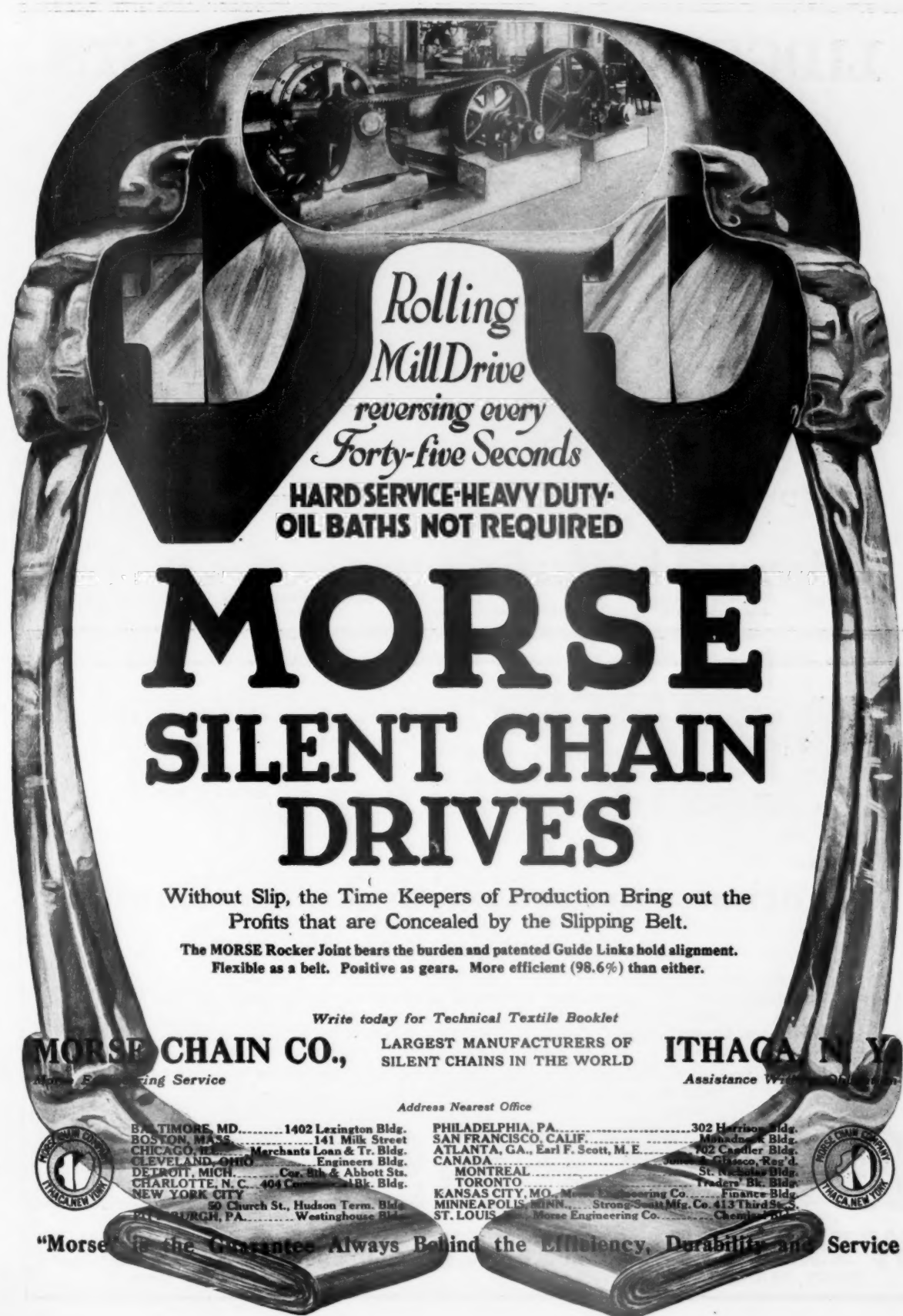
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*Rolling
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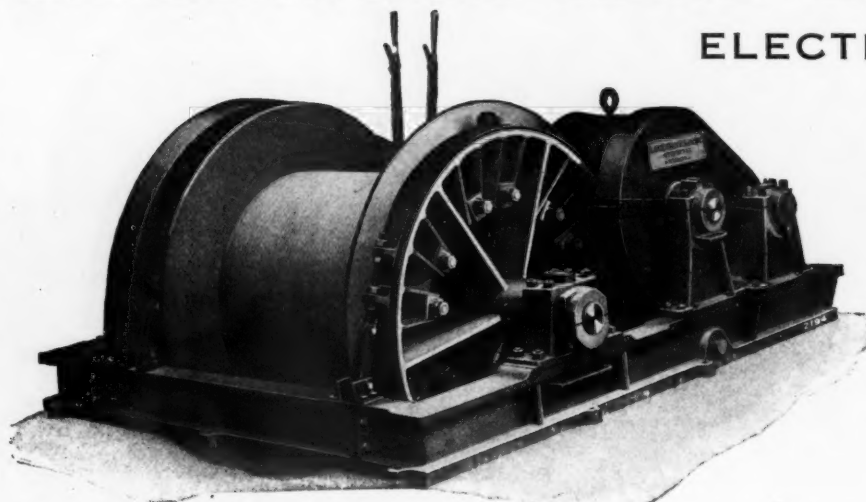


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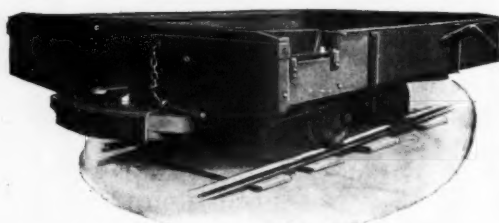
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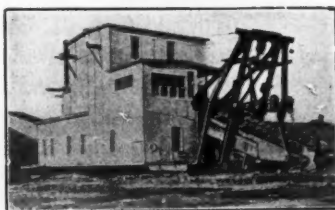
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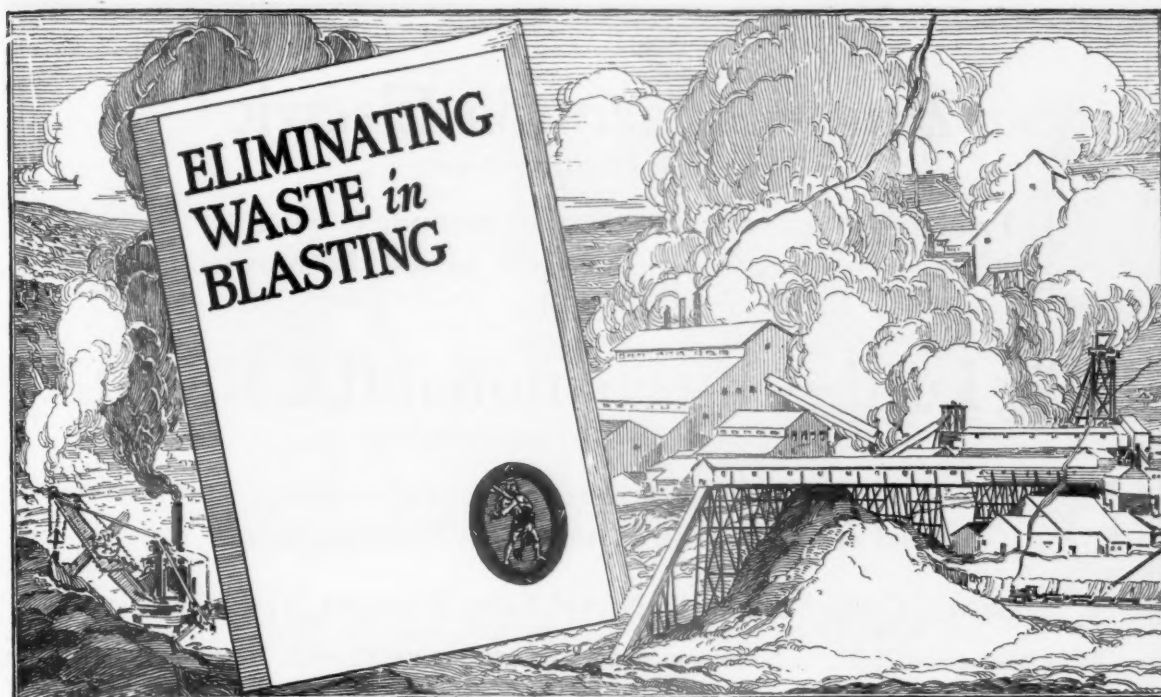
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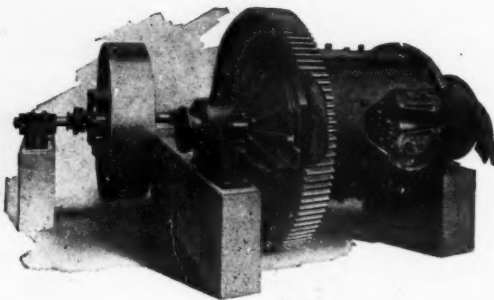
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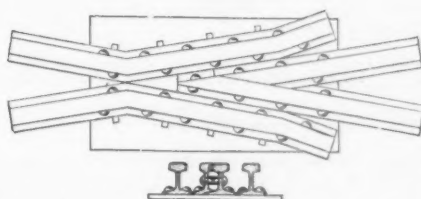
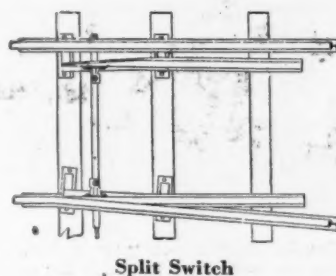
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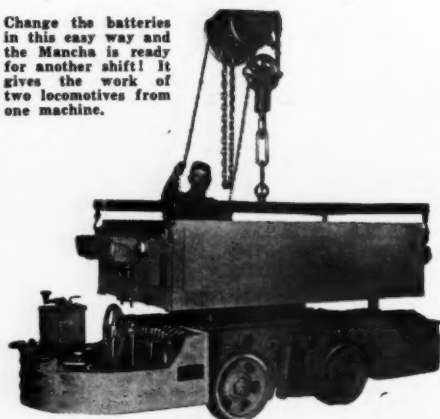
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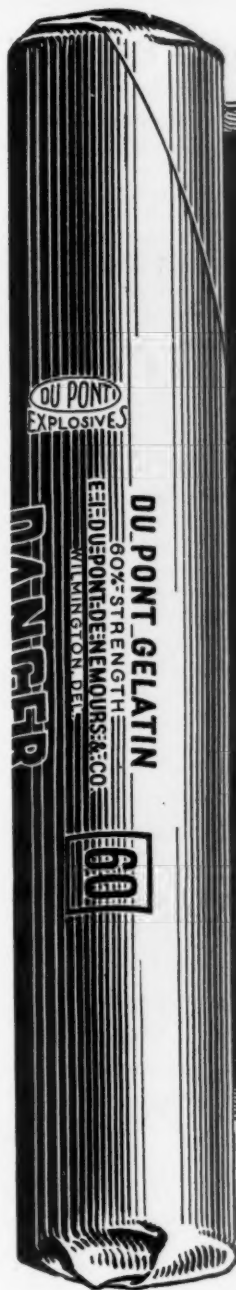
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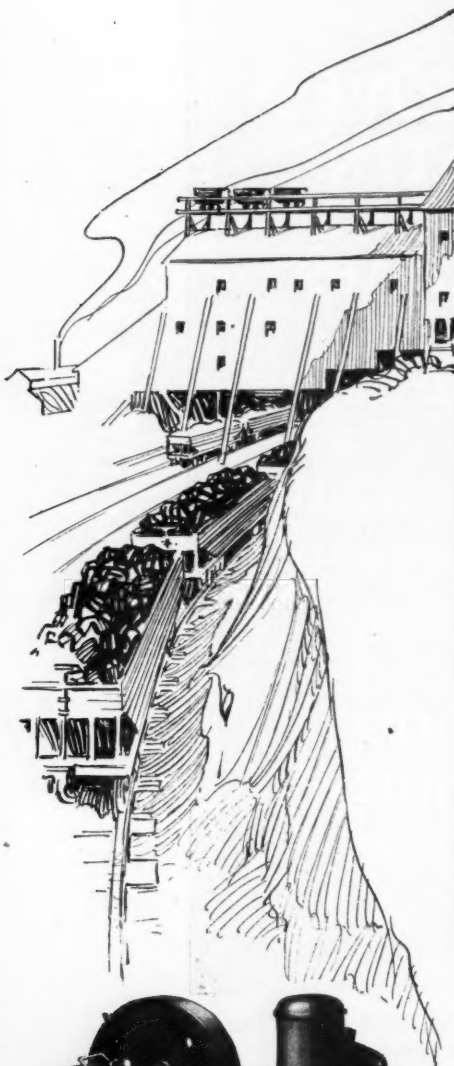
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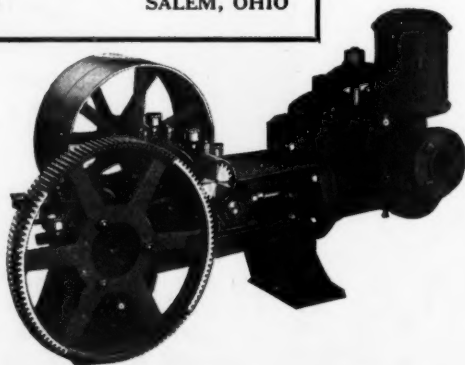
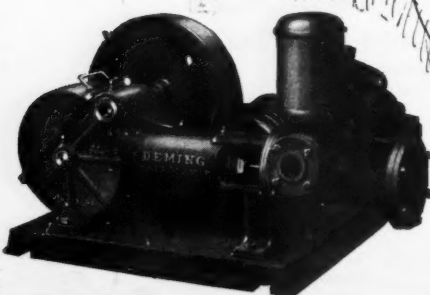
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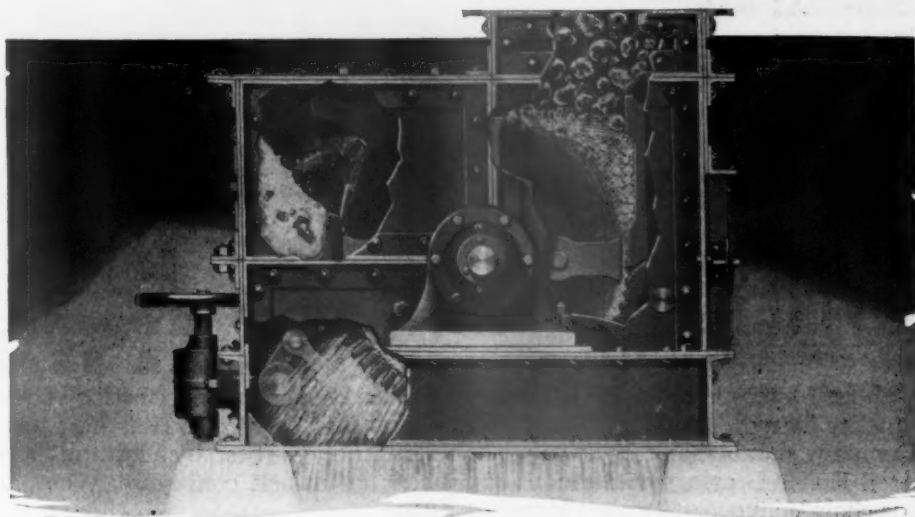
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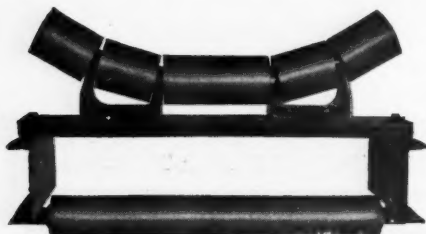
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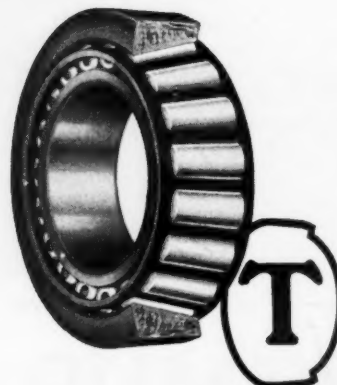
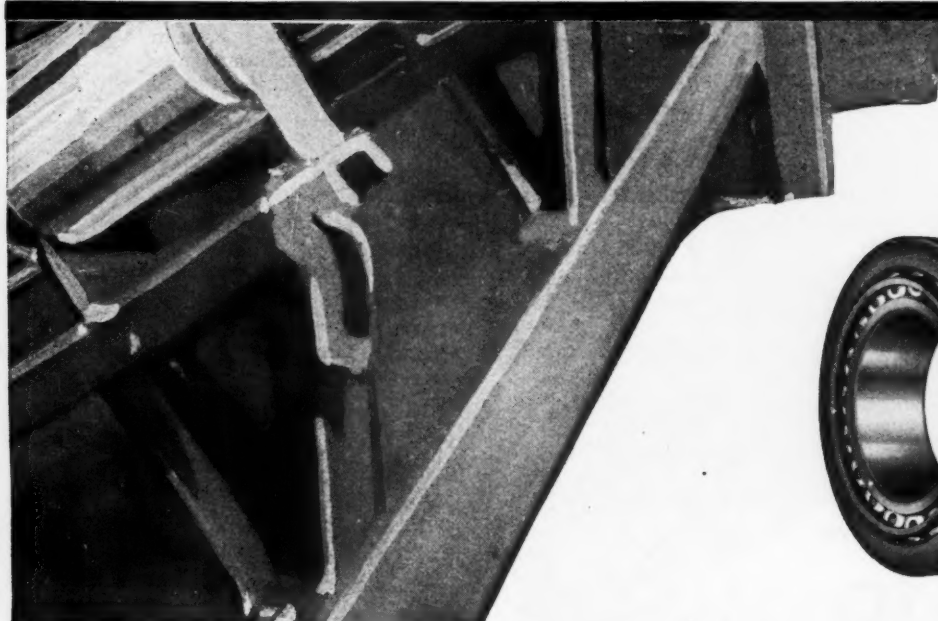
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APRIL, 1923

NUMBER 4

A FARCE IN GOVERNMENT

MALADMINISTRATION of Alaskan affairs, due to unworkable laws, misconceived ideas, and decentralized control, bar the development and utilization of the territory's resources. With its population steadily declining and industrial progress at a standstill, the situation is one which demands the application of drastic remedies. Lack of a responsible local government, experiments in government ownership, restrictive leasing laws, conflicting administrative authority, and failure to coordinate governmental functions, are contributing factors to the unfortunate lethargy which now grips this great territory.

The territorial legislature created by Congress some years ago is prohibited from legislating on most subjects of any real importance, and Congress continues to legislate on matters which vitally affect the welfare of the territory. Thus, the territorial legislature, which is familiar with Alaska's problems and needs, is without power to take such action as changing conditions demand, while Congress, if it acts at all, acts upon reports and hearsay, frequently obtained from irresponsible and biased sources, and is led to try out on a helpless commonwealth every experiment in government control, regulation and ownership which can gather enough political support to pass.

The crushing effect of past and present policies upon the infant industries of Alaska clearly demonstrate the urgent need for new policies and a new system which will give to those who reside in the territory and who are familiar with its conditions broader responsibilities and powers in the determination of its destiny, reserving sufficient control to thwart the aims of private interests which might otherwise gain enough influence to secure monopolies which would be against the public interest.

Administration of Alaskan affairs must be coordinated and simplified as a preliminary move toward constructive efforts which will build up the territory. In the matter of taxation, the territorial legislature has power to impose taxes which are collected and disbursed through the territorial treasurer. Congress also levies taxes for local purposes which are collected and disbursed by the federal treasury; and in addition the federal internal revenue and income taxes apply. Thus it will be seen that three systems of taxation add to the difficulties which territorial enterprises encounter in their struggle for existence. In general, the handling of Alaskan affairs is distributed through the several departments at Washington among more than thirty boards, commissions and bureaus, all of which are exceedingly zealous in retaining control of their respective functions.

Instead of continuing the farce of attempted government from a capital four thousand miles and more distant, and with a multiplicity of agencies whose functions can not possibly be properly coordinated, Congress should establish a centralized government to deal with

Alaskan affairs in Alaska. The present territorial legislature, if given broader powers, would provide a necessary branch of the new system of government. The executive branch could be provided for in a measure similar to the acts of Congress establishing governments for the Philippines, Hawaii and Porto Rico. The laws for the disposition of mineral lands and the development of agricultural and timber lands could be made more adaptable to conditions prevailing in Alaska, and legislation to meet this need could well be left to the territorial legislature, subject to the approval of Congress.

If the people of Alaska are given a better opportunity to work out their destinies, through a satisfactory system of self-government, there is every reason to believe that the development of Alaska's resources will take on new life and that the population of the territory will grow by leaps and bounds as did those of many of the western states whose aggregate resources never exceeded and perhaps never equalled the potential resources of this great northern domain. To contend that the territory will develop under present methods of administration and policies of government is absurd. New methods and sound policies must be applied to give impetus to the growth and development which the territory is entitled, because of its vast resources, to enjoy.

RAILROAD PROSPERITY

RESULTS of railroad operations in 1922 indicate a favorable trend toward railroad stability. An enormous traffic, comparable with the most prosperous years in railroad history, was handled in spite of strike handicaps and extensive repairs of equipment which had been allowed to deteriorate in previous years through lack of adequate attention. There was a marked increase in traffic following the reductions in rates made under the Reduced Rates decision of the Interstate Commerce Commission so that the financial condition of the carriers was not impaired thereby as was predicted by representatives of the roads during the hearings before the commission.

There is reason for believing that the operating expenses of the railroads will be reduced during 1923, with new equipment in use and repairs to rolling stock at a current basis, and that traffic will continue to increase under the stimulating effect of lower rates.

If these results are attained, shippers may hope for still further reductions in rates which will stimulate traffic to a greater degree during 1924 and leave the roads on a sound financial footing. With such a favorable outlook for the future, the people of the country will pay little attention to political jingoes who thrive on wild speculations concerning railroad conditions which they allege can be improved only through federal control or ownership.

IS IT WISE?

IN EVERY CITY are scores of automobiles which develop 80 horsepower and which can reach a speed of 75 miles an hour, or faster. Their drivers can, in the open country, evade the police and actually make 75 miles an hour or more. Some men do it. That is one reason we have so many disasters and so many traffic regulations. Society has learned—from automobiles and trusts—that it is dangerous to allow humans to use all their power. Still, they can evade the police and use it.

However, steering knuckles are liable to break; rubber tires are liable to burst; and, bad springs on rough places are liable to throw the car off the road. Any one of these things may easily plunge an automobile into a ditch or against a telegraph pole.

At that point something enters which is above the law. That is, the driver has the power and at times, can use it. The question is whether it is wise for him to risk his own life and that of his family by driving at what is clearly a dangerous rate of speed. All sensible men know that, sometimes, they need that 80 horsepower to climb hills—in low gear. At times even, they need the speed—when a human life hangs in the balance. At other times, discretion dictates that the power be held in reserve.

In government, we have an exactly paralled situation. The Supreme Court of the United States used to believe that it had certain obligations under our constitution. Whether they were real or assumed obligations, the court nevertheless corrected not only the errors which Congress made in writing laws, but some of its mistakes in the matter of public policy. But after the Northern Securities Company case, the Supreme Court abandoned its old familiar role and left Congress to be the sole judge of the wisdom of its own acts. The court sits now in constitutional questions to see in the main that Congress does not make a mistake in the way it writes its laws. That has had the same effect on Congress as would be produced on motorists if we should take the traffic policeman off the public roads, and leave the motorists to be the sole judges as to what speed they should make. That is, Congress has tremendous power. It is restrained only by one consideration. Is it wise to use all of its power on the joy rides or should it hold something in reserve for the great and grave emergencies—as when national existence is threatened by a great war.

If Congress cares to do a thing it can proceed to do it as though the constitution did not exist. Modern devices have found a loophole in that basic law. The methods by which this is done are too well-known to need mention. It is enough to say that if Congress wishes, for example, to take property regardless of the constitution, it can do so by lodging discretionary powers over that property in the hands of a commission. That commission may issue orders—which are not reviewable by the courts—to the owners of that property which will have the effect of depriving the owner not of his title but of his use and enjoyment of his property.

A first-rate illustration of what is meant is found in the automobile. The title to the automobile resides always and of course in the owner. Thus a man may own as many automobiles as he pleases—all of them in the country, if he has the money—but he can't operate any one of them on the streets unless he gets a license. And, after he gets the license he must obey the rules of the licensor or his license is taken away. Therefore the license while leaving the title undisturbed, modifies the right to use and enjoy the property. Every new order or regulation issued by the licensor is a further limitation upon the use and enjoyment of the property. A

cancellation of the license amounts to a denial of the ownership.

The constitution says that property may not be taken without due process of law. The licensing system establishes due process of law. Thus, in the end, property may be taken which the constitution says may not be taken. Thus, by a technical compliance with the fundamental law, we have learned to violate that law.

It is now recognized that Congress possesses this enormous power. It cannot be prevented from exercising it if it elects to do so. Such industries as coal are thus at the mercy of Congress.

Congress must exercise the same restraint upon itself as does the owner of an automobile. It has the power. It can exercise it if it wants to. It can impose its will upon industry. It can bring, if it wishes, employer, employe, merchant, and consumer under the power of a bureaucracy. It can translate a race of people into a race of slaves—for a little while. It is a question for the legislative body to consider whether such actions are wise; whether it isn't best for the legislature to exercise self restraint in order not to tempt the people to revolt.

In a word, we have, with the abdication of its old power by the Supreme Court a new power residing in the legislative body. The only guide to its action seems to be whether the proposed action is wise. That being true those who are in such industries as coal will have to pay more attention to discussing with Congress the wisdom—or lack of it—of proposed legislation and will have to rely less upon the courts to find the law unconstitutional.

PUBLICITY IN COAL

TWO METROPOLITAN newspapers were, at one time, in furious competition. One of them was gaining circulation steadily. The other was losing it almost as steadily. The one that was losing circulation decided that it would spend some money to win subscribers. A conference of the executives of the paper was held. When the decision was about to be made to spend \$50,000 in a prescribed way, one of the sub-editors spoke up:

"It is my idea that before you start out to sell something, you ought to have something to sell. The people are not taking our newspaper because we have nothing in it. Give me that \$50,000 to spend on contents and I'll get the circulation for you."

That sounded like good business horse sense. Nevertheless, the proposal was turned down with some fine display of scorn. In short order the \$50,000 was spent. While it was being spent, a lot of people saw the paper who had never seen it before. They talked about it. They compared it with their own favorite newspaper. The comparison was destructive. As they talked about it, they told others who, for a long while, had been reading it. The regular readers came, also, to see its demerits. In the end, the newspaper was \$50,000 out of pocket and had less circulation than it had when it started. The venture was a total loss because that newspaper was engaged in a selling campaign and was advertising a worthless product.

Every few weeks, the enthusiasts in publicity trot out a proposal that the coal industry should undertake a publicity campaign. That is very sound doctrine. Coal has, undoubtedly, become a great political question. All political questions must, in the end, be carried to the

people. And there is no better way of carrying any question to the people than through publicity—when publicity is properly understood and intelligently done. Therefore, in the end, the coal industry will have to do some definite and purposeful publicity work. It is endangering its position daily and hourly by its neglect of that great instrument of modern life.

However, publicity is selling. It is an effort to sell an idea. And it is bad business to sell an idea until you have one to deliver. It is just as bad to offer to sell a bad idea about coal as it is to sell a newspaper without any worth-while contents.

Therefore, a necessary preparation for a publicity campaign is to have something which the industry wants to say to the people.

Some enthusiasts recommend that it is enough for the coal industry to say that various proposals touching it are "all wrong." The people are not interested to know what is wrong, merely; they want to know what is right. Publicity which criticizes merely is not publicity at all. That is, nobody ever reads mere criticism. And, without readers, there is no publicity.

Others propose that we shall go to the public with a thesis. Even the man who proposes such a campaign never reads a thesis unless he himself has written it. Merely to print is not publicity.

Such suggestions are wholly beside the point. The coal industry wants to lay a foundation of something to talk about before it does any talking. That is, there must be a lot of action in the trade—action along the line of clearing away the debris of the trade—before anyone begins to do any talking about the industry.

The managers of the coal industry ought to remember that the people are complaining about what they do in coal and not about what they say about what they do.

The first thing to do is to remove the causes of the present complaint—or prove by definite experiments that it cannot be done. After that, there is plenty to talk about.

Mere talking will get nowhere. Actions speak louder than words. The proper kind of action will, if not concealed, create its own publicity. But a world of publicity without action will leave the coal industry in precisely the position it now occupies—wanting the friendship of the people but not being able to win or to hold it.

CONSOLIDATION OF RAILROADS

MERGER of transportation lines, deemed by many students of the railroad situation in the United States as a panacea for transportation ills, is not meeting with general approval, either on the part of the roads involved or of shippers in the localities served by the various roads. Unless further hearings develop a more sympathetic attitude on the part of the public, the Interstate Commerce Commission will proceed cautiously in making final plans for merger of any of the systems embraced in the tentative plan announced.

Considerable opposition to the plan has developed, particularly in the southwest, on the ground that the merger of lines as outlined in the tentative plan will eliminate competition and subject shippers to any level of freight rates which the combined systems may decide upon, thus compelling the shippers to resort to rate litigation under the Interstate Commerce act, under conditions which would make extremely doubtful the possibility of relief.

In view of these circumstances, it is not believed by those who are closely observing the situation that the commission will undertake to immediately act upon its tentative plan which is still in its initial stages and

which may yet be considered a doubtful experiment from which no beneficial results may be secured.

THE MERCHANT MARINE

AMERICAN TRAVELERS in foreign ports, who gaze upon the Stars and Stripes waving proudly from the mastheads of numerous passenger and freight vessels, where less than a decade ago the American flag was seldom seen, realize the importance of holding to a national policy which will insure the continuation of the American merchant marine. The policy which will keep the flag on vessels plying every trade route and in every foreign port is the policy which every American citizen should support whether it involves a government ship subsidy or some other mode of keeping the American merchant fleet afloat. Naturally, the policy which involves the least cost to the nation, at the same time accomplishing desired results, is the policy which should be adopted, and political considerations should not be permitted to stand in the way of its immediate adoption.

The failure of the ship subsidy bill to pass augurs ill for the American merchant marine and insures, at least temporarily, the continued dominance of British shipping. Unless some other method is found for dealing effectively with the situation, the present fleet of the United States Shipping Board, which is rapidly deteriorating, will become useless, and the opportunity to establish a permanent merchant marine at a cost that is practically negligible will pass with the passing of the fleet. American industries will then again be served by foreign shipping interests who will subordinate American interests to those of their own countries. Verily, a sad prospect!

BLOCS

THE BLOC system of legislative control which thwarts the will of majorities in Congress and many of the state legislatures is certain to lead to the wrecking of policies and principles which are in the public interest, if the system is allowed to operate unrestrained. The bloc system does not recognize the public interest where that interest conflicts with the program of the bloc.

Legislative blocs are not formed to promote the interests of the country at large, but are organized to compel recognition and consideration of special interests, therefore they should have no place in a representative form of government. Legislative majorities should not be compelled to bow to the will of blocs representing minorities, as a condition precedent to the passage of legislation which is of paramount importance to the welfare of the state or nation.

With blocs defeating policies of elected majorities at every turn, the legislative machinery of the federal and state governments can not be expected to function properly. The electorate, therefore, should insist that their representatives in state legislatures and in Congress refrain from affiliating with special groups whose interests are in conflict with the interests of the general public. Grave consequences, involving financial loss, loss of prestige, and weakening of national solidarity, may be anticipated if the bloc system is permitted to hold sway in state and national legislative bodies. The preventive remedy lies in disbanding the blocs.

THE FACTS ABOUT COAL

THE BORAH amendment to the Coal Commission act must result in extended debate among coal operators. In time, they must take action—either to test its constitutionality or to comply, meekly, with its mandates. Whichever action they take will be discussed, critically, by the public. In the discussion which is about to ensue, one vital truth must be held steadfastly in mind. The coal industry has never refused or failed to give information to any public body; to the press; or to any organized inquirer. It makes no such refusal now. It is not likely to make any such refusal in future. Instead the industry has tried repeatedly to tell the people the whole truth about itself and, generally speaking, the people have refused to listen. It is of record that long before the people became keen to know, the industry was eager to tell.

Specifically, any one of a score of outstanding operators could relate in detail their efforts to lay the facts about coal before Presidents Roosevelt, Taft and Wilson. They could, if they would do so, tell what sort of a sorry reception they received from those gentlemen. One president, for example, brusquely refused to listen and turned on his heel leaving an astounded group of operators to study his retreating back.

In the various coal states are records of the persistent efforts of the coal operators to tell their story to the governors. One group of 300 men could describe what happened to them—how the governor smiled and walked away.

The men who are most skilled in seeking publicity for coal could, if they would, tell a long and interesting story of their effort to lay the facts about coal before the reading public and of the unfailing rebukes they received from publishers. Even in connection with great strikes, the leaders of the industry can tell of hours and days spent with the representatives of the press only to find no single word they had spoken ever reproduced.

The coal operators do not complain that in the past they have been coldly received. All they ask is that some slight recognition be made of the fact that they have never been secretive about their business. They rely upon their record to support their assertion that they do not now want to withhold information. But when the public refused to listen when an industry was being bankrupt and now demands information when that same industry is enjoying a brief period of profit, any fair judge will have to admit there is virtue in the major contention of the operators. That contention is that if the people insist upon measuring the profits in one short period, they should be willing to measure also the losses over the long period. That is, if the plea of the plaintiff is to be presented before the bar of public opinion, the statement of the defendant should also be heard.

The operators put their case in this way:

If any detailed transactions of any mine are to be held up to public scrutiny, the whole history of that mine should be told—from the time the first coal was mined until the last pillar was drawn. Then, only, will it or can it be known whether the mine netted its owner a profit or a loss.

There is equal virtue in the second contention of the operators. They hold that if information about them is to be gathered by a public agency and if that agency is to attempt to prescribe in future their trade practices, they should not only be allowed to scrutinize the blank forms on which the information is to be submitted; they should have the right to discuss earnestly with the investigators the purpose for which the information is

gathered and the manner in which it is to be assembled. It should be realized that this information when collected is expected to be of such a character as to allow the investigators to determine from it the whole future policy of a great industry. If that shall be the result of sittings of the commission—as Congress proposes and as the Administration expects—the men who manage these mines and who have their fortunes at stake are going to be affected vitally. The case is similar to a law suit in which all of the defendant's property is involved. Gathering the information is like making the record in that case. To exclude the operator is like asking the defendant to dismiss his attorney and to leave his case in the hands of the court.

These men are the responsible managers of two and a half billions of invested capital. They stand in the position of trustees of pooled wealth. It is a great deal to ask that they answer questions blindly; that they submit information to any inquirer asking questions at random; and that they sit with their hands folded while somebody, not interested to the extent of a penny, shall decide for them what their future is to be. It is only human that these men should want to discuss with their investigators the points which are to be proved and to have prolonged and earnest discussions concerning the methods by which information is to be assembled and compiled. These men would not be true to their trust if they failed to protect the property in their keeping.

And there is great virtue in the third contention of the operators. They have had long and enlightening experience with the human mind. They know how difficult it is for most minds to grasp new facts or ideas. They have seen their own children trained in school. They have seen their young and alert clerk try to learn quickly the routine of their offices. They have seen trained managers of mines try to grasp new ideas. They have seen how slowly the people take to a new coal or to a new method of burning a familiar coal. Out of their vast experience, they know how stubbornly the human mind resists information. Yet, with this experience in the background they are asked to believe that, by the submission of one report—which must, in the nature of things, be voluminous—the whole people are going to come to know the truth about coal. They are asked to believe that when this commission shall make its recommendations, they will be carried instantly into effect. They are, thus, asked to look forward to the dissolution of coal difficulties; the complete cleansing of the trade of its abuses; and, thereafter, the silencing of all complaints about coal. The experience of the operators teaches them that these things are utterly, hopelessly impossible. They cannot believe that, on any subject the people will ever be miraculously cured of ignorance over night. And, they refuse to believe that, even though a panacea shall be proposed, it will be accepted over night. They know that the decalogue is about 4,000 years old. They are convinced that it is neither known to nor observed by so few as one race or one sect in one nation. The operators argue, with ample justification, that if the race cannot absorb ten commandments in four thousand years, the American nation will not absorb a great volume over night.

The coal operators are not expecting a miracle. They do not want to be forced to act as if they believed one to be imminent. If, in their skepticism, they shall prove conservative in the surrender of their private papers, a fair judge must admit that there is some virtue in their major premises.

MINERALS SEPARATION ARGUMENT IS CONCLUDED

Federal Trade Commission Takes Long Drawn-Out Case Under Consideration, Preparatory To Rendering Decision—Based On Flotation Process Rights And Use of Equipment

FINAL ARGUMENTS in the Minerals Separation case before the Federal Trade Commission were heard March 19, when the question of whether charges made in the complaint would be upheld by decision of the commission was taken under consideration.

OF HIGH IMPORTANCE

The case is one of the most important ever before the commission, involving as it does the practices under which the Minerals Separations Syndicate and its allied companies have distributed and released the flotation processes covered in its patents. During the several years since the proceeding was instituted by the commission, ponderous documents concerning the case have piled up as hearings and investigations conducted from one coast to the other, as all possible angles involved in these practices were drawn out by the commission's investigators and attorneys and defended by the companies named in the complaint.

Charges that the defendants, by means of their practices, were stifling competition and instituting a monopoly, to the detriment of the mining industry, were made shortly after a letter had been addressed to mine operators throughout the country on the subject of violation of patents covering its process.

Testimony taken during the course of the case at Washington, New York, San Francisco and Denver was brought out by the commission in efforts to establish the handicap under which the mining industry was placed by the alleged monopoly. The largest metal-producing units in the West from the start were vitally interested in the proceedings, suits being instituted by the syndicate against several of them on alleged infringement of the patents covering froth flotation. These cases were all ad-

justed at a comparatively recent date, however, with the effect that restrictions embodied in the syndicate's original contracts undoubtedly were modified.

"A PRACTICAL MONOPOLY"

In the final argument, held two weeks ago, in the case, with Commissioners Thompson, Gaskill and Van Fleet sitting, Counsel Alvord for the commission declared, "Minerals Separation has a practical monopoly of the flotation processes.

"There are other processes of the same nature which have been in limited use," he declared, "but Minerals Separation controls 98 per cent of all known flotation. It has issued one hundred and forty licenses to mine owners and others who are using the process for reclaiming waste mineral from mining dumps in the United States. With the exception of four instances, all of these licenses were issued under a standard form. Since the testimony in this case was closed, licenses have been issued in another form."

Attorney Cook appearing for Minerals Separation said the Anaconda contract was the new form of license in use.

In summing up his argument Mr. Alvord outlined the arrangement under which the syndicate contracts with manufacturers for the manufacture of machines built to the order of Minerals Separation, the contract providing that when machinery is completed Minerals Separation receive a statement of the charges to which it adds its additional charges and bills the purchaser. In contracts for manufacture of machines other than for Minerals Separation the syndicate requires payment from the manufacturer for the privilege of selling froth flotation machines.

Charging violation of Section 5 of the Federal Trade Commission act, it was

declared by the commission's counsel that licenses issued by the syndicate restricted licensees to use of machinery of its manufacture. Modifications in more recent contracts, however, allow use of other machines under permission of Minerals Separation.

Citation was made of the contract made by Minerals Separation with the Stimson Company to manufacture machines, under which the company was given permission to sell its machine to licensees on a commission to Minerals Separation at 25 percent and by making the syndicate the sole licensee of the manufacturer, who could sell machines to none but licensees.

This was held to be the general attitude of Minerals Separation toward manufacturers. During the arguments the question arose as to whether operations of Minerals Separation constituted interstate commerce, the point being raised by Commissioners Gaskill and Van Fleet. Mr. Alvord argued that all activities of the syndicate did constitute interstate commerce as they involved transportation of persons and information across state lines through the demand made by Minerals Separation of licensees' reports and the carrying on of inspection of plants by its own engineers. He pointed out that the 140 licenses covered mines situated in every state in which minerals are produced, including Alaska. The corporation is a Maryland concern, with principal offices in New York and San Francisco.

Attorney Cook's defense of the corporation was based largely upon the contention that the issues had been decided in the syndicate's favor by the Supreme Court and could not be relitigated by those who had lost in infringement suits. He contended that the flotation process was the property of the



patentees. The company's basic patents expire in 1927.

"DOES NOT SELL GOODS"

Mr. Cook contended that the company does not sell or lease goods or commodities, but licenses its process, and under the law a license of the process is an indemnity to the licensee from suit for using this process. He stated that the company had spent \$1,000,000 in England and Australia and about \$2,000,000 in the United States in connection with its work.

Adjustments have been made with the Juneau, Ray, Butte and Superior, and Nevada Consolidated companies by the syndicate, Mr. Cook declared. "This fact should place us before the commission not as the subject of scorn and attack, but in a fair and just light," he said.

Mr. Cook stated that there is no flotation process that does not involve the principles of either the first or the second minerals separations patents.

He then sought to present proof that whether the machine by which a patented process is used is an infringement does not stand as material in the matter of law, stating that use of the process by means of any machine without the consent of the patentee of the process constitutes an infringement.

DISCUSSION OF LETTER

Swinging directly into the charge of restricted competition and creation of a monopoly, the arguments by counsel and questions by commissioners centered around a letter sent by the corporation to mining operators. The commissioners apparently construed this communication as sufficient cause for marked complaint, holding that it was sent to all operators without investigation as to whether they were using flotation processes and had the effect of making many cease operations under the belief that they were violating the corporation's patents when such was not the case.

Counsel for the corporation sought to show that the letter was broadcasted "not to threaten, but to give notice of rights" held by the corporation through its patent. Members of the commission evidently held the attitude that this letter, through the questionnaire attached to it, was used by the corporation in an effort to discover which companies might be classified as infringing the patent. Discussing the letter further Commissioner Gaskill declared that "external evidences of action must govern" consideration of matters such as this. He asked whether the "excess of scope" used in distribution of the letter broadcast throughout the industry was not "evidence that the company was doing more than state its case."

SENATOR SAMUEL D. NICHOLSON DIES

SAMUEL D. NICHOLSON, United States Senator from Colorado, died March 25 at his home in Denver, following a struggle against the final attacks of a longstanding illness that set its grip tightly upon him in the moment when the major effort of his career in the Senate was entering its final stage. Always a staunch friend of the mining

Edward Island, Canada, and received his education there and later at Bay City, Mich. He went to work in the metal mines at Leadville, Colorado, in 1881, and then went to the Trinidad coal fields in the southern part of the state, where he advanced through the position of foreman to that of mine manager. He engaged extensively in operation of mines in several western states.

His entry into politics occurred in 1893, when he was elected mayor of Leadville, in which capacity he served until 1897. He was twice defeated for the Republican nomination for the governorship of Colorado. During the war, he was state chairman of the liberty and victory loan drives, state chairman of the Roosevelt memorial campaign, state chairman of the Salvation Army drive and state fuel administrator.

He was elected to the Senate in 1920, to succeed Senator Charles S. Thomas. His term would have expired in 1927.

He early became identified with determined efforts along lines of benefit to the mining industry, and was the first governor of the Colorado chapter of the American Mining Congress.

The outstanding mark of his character throughout his career rested in his aggressiveness in the direction of fairness, which trait, coupled with the integrities of his personal and political policies, won him a firm place among the people of Colorado in particular and the western states in general.

During his short term in the Senate, Senator Nicholson had grown popular on both sides of the chamber. He participated very little in debate, but he displayed an intense interest in farm legislation and various other subjects and took part in many conferences in which laws were drafted. His most important committee assignment was naval affairs, and he was also a member of the committees on civil service, manufactures and mines and mining.

TAX ATTORNEYS MUST FILE STATEMENTS

The Internal Revenue Bureau announces that all attorneys, agents, and others practicing before the Treasury Department, or any of its bureaus or offices, including particularly the Bureau of Internal Revenue, are required to file with the chief clerk of the Treasury Department, in duplicate, a signed declaration in writing stating whether or not the business in which the attorney or agent appears before the department is being handled on a contingent basis, and, if so, on what basis and under what arrangements regarding compensation.



SAMUEL D. NICHOLSON

industry, because of his long and intimate association with operations in several western states, Senator Nicholson had been devoting untiring efforts to initiation of an investigation authorized by Congress to make a study of conditions in the gold and silver mining industries. It was while the resolution he had introduced proposing creation of a commission for that purpose was making its way through legislative channels during the last days of the Sixty-seventh Congress that the senator first felt the attacks of illness which at first was believed to be la grippe, but which proved, upon close diagnosis, to be carcinoma, or cancer of the liver.

It was nine days before the adjournment of Congress that Senator Nicholson called a physician for the first time in his life. He was advised to consult the Mayo brothers at Rochester, Minn. Consultations held by Drs. Charles and William Mayo and Dr. Hubert Work, Secretary of the Interior, who was called at Senator Nicholson's request, developed the conclusion that an operation was not expedient. With his condition rapidly growing more serious, the senator asked that he be taken to his home in Denver.

Senator Nicholson was born on Prince



IMMIGRATION QUOTAS ALMOST FILLED



First Seven Months of Fiscal Year Bring Record Number of Aliens—Allotments of Various Countries Approach Exhaustion—Figures On Miners Are Issued

IMMIGRATION statistics released by the Department of Labor show a condition of affairs that holds high concern for the metal mining industry. During the first seven months of the present fiscal year, these figures indicate, the 3 percent quotas for the full year of such countries as Hungary, Italy, Rumania, Poland and Greece were exhausted. Under these circumstances no aliens will enter this country from these foreign lands until next July, beyond those admitted under exceptions which bear no relation to the mining industry's labor needs.

STATISTICS ON MINERS

Making no distinction between coal and metal miners, the detailed statistics issued by the department show an immigration of 400 miners during January, against which is balanced an emigration of only 38. Corresponding figures for the first seven months of the present fiscal year show an immigration of 3,021 and an emigration of 522.

Under the head of "laborers," the tables show immigration of 3,268 in January and 42,764 for the seven months, with corresponding emigration figures of 1,973 and 25,400.

While these statistics would seem to indicate a balance of mining labor favorable to the industry has been gained as a result of the preponderance of aliens entering this country as compared to those departing for their native lands, the fact is that they do not furnish an accurate portrayal. This is proven in degree by the fact that at the very time that the iron and steel centers are feeling a perceptible shortage, the figures credit these industrial operations with a gain of 280 alien workers during January against a loss of only 2 men, while the figures for seven months place 42,764 immigrants against recorded emigration for that period of 25,400.

FACES OTHER LOSSES

In addition, the mining industry faces labor losses beyond those caused by emigration, for vast numbers of men who have worked in the mines during the months of severe weather will turn to outside work in other industries with the advent of spring and summer.

With nations that furnish a large number of skilled miners to this country already up to the limit of their quotas for the year within the first seven months, and with harassing conditions invited all the more by the exodus of

miners to other industries, mining operations may be very hard pressed for labor.

Congress, meanwhile, is in adjournment and consequently no legislative moves can be made in connection with the immigration laws until next year. It is a certainty, however, that strong efforts will be exerted by members of the House Committee on Immigration to

The next session of Congress may find opposing schools of thought on the immigration question brought into a more direct conflict than has previously marked discussion of the subject, if early indications are correct.

Strongest evidence that this condition will become evident shortly after Congress convenes next December is found in the recent statement by Senator James E. Watson, Indiana, spokesman for the administration, to the effect that the White House schedule of proposed legislative action includes a liberalization of the immigration laws.

It is being taken for granted that members of the House Committee on Immigration who stand for a further reduction in the number of in-coming aliens will continue their advocacy of quotas based on two percent of the 1890 census figures.

push through the proposal molded during the last session to provide for a further reduction in the number of aliens admitted each year by basing the quotas on the 1890 census and cutting them from 3 to 2 percent.

UPSETS NORMAL TREND

The present law sets the total number of aliens to be admitted during the fiscal year ending June 30 at 357,803. Of this number, 300,505 have been admitted in the first seven months. The net gain of immigration over emigration during the seven month period totals 241,134. The corresponding gain during the first seven months of last fiscal year was only 70,463. These figures are being taken in well informed quarters to forecast the turn which constant reduction of immigration to set quotas year after year will tend to have. The flow will be backed up more and more unnaturally toward the first of each fiscal year, leaving prac-

tically no influx of aliens for the later months. This freakish and irregular supply of labor to domestic industries, it is being pointed out, will tie additional knots in the already badly tangled situation.

Statistics for the first seven months of the fiscal year follow:

	Immi-grants	Emi-grants	Net gain
July, 1922.....	41,241	14,738	26,503
August	42,735	10,448	32,287
September	49,881	7,527	42,354
October	54,129	7,192	46,937
November	49,814	7,077	42,737
December	33,932	8,157	25,775
January, 1923..	28,773	4,232	24,541

January statistics for states in which mining operations are prominent follow:

	Immigrant	Emigrant
Alabama	281	30
Alaska	111	54
Arizona	5,484	164
Arkansas	140	6
California	22,686	5,340
Colorado	993	182
Idaho	368	76
Illino's	22,493	3,614
Indiana	2,863	362
Iowa	1,730	225
Kansas	791	92
Kentucky	325	48
Michigan	16,127	1,834
Minnesota	3,767	481
Missouri	2,494	368
Montana	843	185
Nevada	211	48
New Mexico	672	51
North Dakota....	657	101
Ohio	12,038	2,074
Oklahoma	340	50
Oregon	2,200	330
Pennsylvania	26,159	4,741
South Dakota	398	52
Tennessee	250	24
Texas	16,788	899
Utah	638	169
Washington	5,266	964
West Virginia....	1,231	332
Wisconsin	4,186	541
Wyoming	316	55

COLORADO RIVER ACTION IS EXPECTED

LEGISLATION is expected to be introduced when Congress convenes creating a Colorado River Commission, consisting of the Secretary of Commerce, Chief of Engineers of the Army, Chief Engineer of the Federal Power Commission, and the directors of the Geological Survey and Reclamation Service for development of the lower Colorado River basin. It is proposed that the commission recommend the construction of dams for power development, and authorize the sale for 40 years of surplus power, charges for power to be adjusted at the end of 5, 10 or 20-year periods.

RESCUE MEET TO BE HELD AT SALT LAKE

Western City Gets Close Margin of Favor Over Des Moines in Final Selection—Record Number of Entries Expected—Holmes Medals to be Presented

THE SEVENTH International First Aid and Mine Rescue meet in Salt Lake City on August 27, 28 and 29. This announcement was made by Secretary Work of the Department of the Interior following acceptance of an invitation tendered Governor Mabey, of Utah. Final choice in selecting the meeting place lay between Salt Lake City and Des Moines, Iowa.

With the exception of last year, when the coal strike prevented the holding of the meet, miners' teams from all sections of the country have met annually in competition for the international championships, cups, medals and other prizes awarded to the teams most proficient in first aid and mine rescue work. These meetings are held under auspices of the Bureau of Mines, in cooperation with the National Safety Council, the American Red Cross, miners' organizations, operators' associations and other agencies.

Sixty-three teams of miners from almost every mining community in the United States and a championship first-aid team from British Columbia, Canada, competed in the last international contests, which were held in St. Louis in 1921. Representatives of the governments and mining industries of Great Britain, Mexico, France and Belgium also attended the meeting. With promises of continued operation of coal mines during the summer months, it is expected that the number of teams entered in this year's contests will exceed all previous entries.

In the first aid and mine rescue contests to be held in Salt Lake City, competition between the various teams will be held under conditions approximating as closely as possible the conditions found at a mine during an accident. It is planned to erect a special gallery, to be filled with poisonous gases, in which the mine-rescue teams, wearing the oxygen-breathing apparatus, may compete.

Four miners who risked or lost their lives in attempting to save their fellow workers have been awarded gold hero medals by the Joseph A. Holmes Safety Association, which annually selects distinctive acts of bravery in the mining industry. Presentation of the medals will form a portion of the program of the Salt Lake City meet.

Warren A. Hoy, Frank Carter and Pete G. Rumpf, all of whom were employed in the Lincoln Colliery, Rausch Creek, Pa., are awarded medals for rescue work when three men were overcome by dynamite fumes in a drainage tunnel.

The fourth medal is awarded to William H. McKiernan. The Hoy and McKiernan awards will be made posthumously, both men having met death in carrying through the acts of valor that brought distinction to their names.

The Joseph A. Holmes Safety Association was organized as a memorial to Dr. Joseph A. Holmes, the first director of the U. S. Bureau of Mines, who virtually gave his own life to the cause of safety in mining. During the past year 47 local safety chapters of the association have been organized for the primary purpose of preventing accidents

and improving health conditions in the mining industries and providing facilities for training the chapter members in first aid and mine rescue work.

Chapters have been organized in the following places: Parish and Newcastle, Ala.; Grass Valley, Calif.; Cokedale, Colo.; Scranton, Noonan, Garrison and Zap, N. Dak.; Pierce and Brewster, Fla.; Lawrenceville, Gillespie, Danville, Bush and Maryville, Ill.; Bicknell, Sullivan, Clinton, Dugger, Jasonville and Hymera, Ind.; Bay City, St. Charles and Saginaw, Mich.; Desloge, Mo.; Butte and Anaconda, Mont.; Cuylerville, N. Y.; South Fork, Lilly, Frugality, Fallen Timber, Blandburg, Coalport, Madera, Smoke Run and Munson, Pa.; Dayton, Newcomb and Coal Creek, Tenn.; Dante, Wilder and Leona Mine, Va.; Palmer, Wash., and Lumberport, W. Va.

COAL COMMISSION TAKES ON NEW LIFE

Congressional Appropriation Provides Certainty For Future Which Gives Assurance For Intensive Studies Now Being Pursued.

GIVEN A NEW lease on life by additional appropriations granted during the last hours of the Sixty-seventh Congress, the coal commission is striking out in an earnest pursuit of details. Its staff was enlarged within two weeks from a total of 174 persons until the official roster carried 216 names. Investigations of cost accounting and waste in mining are reported to be well ahead of schedule.

The following investigators were appointed to do field work in connection with the commission's investigation of the cause of strikes:

Prof. Willard E. Hotchkiss, former secretary of the Shipbuilding Labor Adjustment Board, dean of the School of Commerce of Northwestern University, and secretary of the President's Industrial Conference.

John S. Keir, head of the Department of Industrial Economics, Carnegie Institute, Pittsburgh.

O. Le Freble, who specialized on personnel relations in several industries, and as examiner for the Shipbuilding Labor Adjustment Board handled industrial relations in shipyards of New England for the Navy.

Royal S. Melendy, whose work in labor management included connection with the Stevenson Corporation in New York, and the Firestone Tube and Rubber Company of Akron.

Otto T. Mallery, who was a member of the State Industrial Board of Pennsylvania.

Dr. Boris Emmett, formerly with the Department of Labor and for some years

labor manager for H. Sonneborn and Company, Baltimore.

S. B. Mathewson, director of personnel for Antioch College, formerly with the Scott Company, industrial consultants.

Charles Frazier, until recently investigator employed by the International Association of Machinists.

Russell G. Wagenet, labor manager of the clothing industry at Rochester.

Henry S. Gilbertson, formerly with Dr. Hotchkiss and now with a firm of industrial engineers in organization work for the State of Kentucky.

Instructions were given these agents at a conference held by Commissioner Neill, Director Bain of the Bureau of Mines and members of the commission's staff. It was said these men were qualified for investigation because of having had industrial relations in different industries which have been working on the industrial relations problem.

The work of the investigators will be largely under the direction of Prof. Joseph H. Willits, of the commission's staff. The investigators will visit every mining district, an individual investigator inspecting a separate district. The anthracite region will be the first to be investigated, to be followed by investigations in bituminous districts. It is not expected these investigators will require submission of data by either the miners or operators, but that they will obtain their information in conferences with mine superintendents and union officials.

THE PROGRESS OF STANDARDIZATION

Movement Stands as Logical Phase of Industrial Evolution—Aims to Cut Network of Complexities—Mining Industry a Pioneer—Many Associations Now Active

INSPIRATION, creation, and initiation all are associated with thoughts that freely flash their ways out beyond the realm of the commonplace and thus come upon new things. It is natural that origination takes place in atmosphere of freedom, and it is only logical that the first stages of any development should proceed through an era of growth marked in degree by a lack of dictated restraint.

Industrial history presents evidence of this trend during earlier years. Manufacturing in its earlier stages leaped forward through a multitude of channels without thought of "coordination." Development was the word and all energy was concentrated along creative lines. Each mine worked within itself. The result was that industrial operation became so diversified by reason of this freedom that a vast bewildering network of conflicting methods was beginning to hamper industry when "standardization" was brought in for the first time some years ago to simplify the situation.

The ingenuity and originality manifested before the dawn of the standardization era now are evidencing themselves just as certainly as when inventive genius brought forth the cotton gin, the harvester, the flotation process of metallurgical separation and other pillars in the building of this country's mass of production. Standardization merely is directing ingenuity and originality along the lines in which they will be of greatest aid to industry's present stages. Evidence of the logicity of this control and necessity for coordination is found in abundance

by a study of the broad scope of standardization activities at the present time. As by one word, though without premeditation, practically every major industry in the country is intensively devoting itself to a study of the subject with the twin aims of efficiency and economy in operations.

A TRUE PIONEER

The mining industry is a true pioneer in this field. Almost two decades ago the American Mining Congress definitely set itself at the task of forming standards for electrical equipment in coal and metal mines. The resulting codes formed the basis of safety laws placed upon the books of these states more than ten years ago.

Following adoption of definite standards for electric mining equipment, a move to which a great saving in lives and property may be accredited, the Mining Congress initiated a broad campaign for a thorough standardization of the industry. The work progressed from year to year until it assumed such scope that a standardization conference for consideration of mining equipment and operating methods was called in St. Louis in 1919. National conferences were held during the succeeding three years at Denver, Chicago and Cleveland, and the fourth is to be held at Milwaukee September 24 to 29 of this year in connection with the annual convention of the American Mining Congress.

During this period many special committees have been appointed, each of them devoted to the work of framing tentative standards for a particular phase

of mining operations and machinery. The work of some of these committees has been successfully concluded, their findings having been submitted to the Cleveland conference last year. Many others are close to the final phase of their activities. The standardization conferences of the next two or three years will find an increasing amount of tangible results shown by the work as the steady succession of committee reports are presented.

A study of the standardization movement covering the major industries shows that similar marked progress is being made on preliminary investigations that must be conducted before standards can be set.

Standardization has come to form an important part in the work of the representative industrial bodies of the nation. In the front rank of these are:

American Bureau of Shipping, American Electric Railway Association, American Gas Association, American Gear Manufacturers' Association, American Institute of Electrical Engineers, American Railway Association, American Society for Testing Materials, Associated Manufacturers of Electrical Supplies, Association of American Steel Manufacturers, Electric Power Club, National Association of Heating and Piping Contractors, National Association of Mutual Casualty Companies, National Association of Purchasing Agents, National Board of Fire Underwriters, National Bureau of Casualty and Surety Underwriters, National Fire Protection Association, Railway Car Manufacturers' Association, Silk Association of America and Society of Automotive Engineers.

LEADERS OF INDUSTRY TO DISCUSS COOPERATION

Men of Broad Experience to Meet in New York City This Month—Gathering Will Be a Marker in Campaign To Eliminate Friction in Industrial Relations

THE MOVEMENT to increase industrial cooperation through the creation of improved relations generally between employers and employees will receive a distinct impetus when leaders of the nation's business gather in New York, April 27, to discuss the subject under the auspices of the Industrial Cooperative Division of the American Mining Congress. The advice drawn by men who have had broad experience in efforts to eliminate friction in industrial operations will be presented to furnish guidance in mapping out phases of the work succeeding those

already initiated by the division of the American Mining Congress.

This gathering will stand as a marker in the pioneering campaign now being carried forward which places the mining industry as the first major branch of the country's industrial machine to actively enter into an effort to secure a more general understanding among the various industrial groups. Education will be the chief means by which this will be accomplished.

Already committees have been appointed in each mining state, and where both coal and metal operations are found

within a single state separate committees have been appointed for each.

Through these state committees, which will conduct a thorough research into the basics of existing industrial relations, a wealth of hitherto unavailable information will be gathered during the initial phases of the campaign.

Invitations for the New York meeting, issued by Sidney J. Jennings, vice-president of the United States Smelting and Refining Company, as president of the American Mining Congress, have been extended to leaders in the mining industry in general and members of the state committees in particular.

TAX RETURNS MIRROR BUSINESS REVIVAL

Substantial Increase Over Last Year's Receipts Indicates Improvement—Changes in Bureau's Personnel.

EARLY REPORTS concerning federal income tax collections this year indicate that the returns for 1922 will reflect the results of a marked revival of business. The clerical forces of the Bureau of Internal Revenue are busily engaged in tabulating the figures received from the district collectors. An increase in the number of individuals making returns, as well as a substantial increase in receipts over last year, is indicated from preliminary reports.

Income tax rates applicable to individuals are not as high in the United States as in leading foreign countries, according to comparative figures released by the bureau. The tax due from a married man with two dependent children on a net income of \$5,000 would be in the United States, \$68; France, \$96; Canada, \$156; Germany, \$292; Great Britain, \$320.76. On \$10,000, United States, \$456; France, \$416; Canada, \$478; Germany, \$701; Great Britain, \$1,128.32. On \$50,000, United States, \$8,576; France, \$9,316; Canada, \$9,078; Germany, \$11,438.91; Great Britain, \$17,450.45. On \$100,000, United States, \$30,076; France, \$29,416; Canada, \$31,078; Germany, \$30,490.41; Great Britain, \$43,450.45.

The income tax unit has been engaged in the task of cleaning up 1917 cases before the expiration of the period of limitation within which assessments must be made. In cases where waivers could not be secured from taxpayers additional taxes have been assessed, in many instances arbitrarily, without giving taxpayers opportunity for hearings. In such cases, as provided in the 1921 law, however, claims for abatement will be entertained.

The commissioner has reported that during the past year refunds aggregating \$79,000,000 have been allowed, and that this total may be equalled or possibly exceeded this year as the result of the audit of corporation returns for 1918 and 1919 which is now in progress. The commissioner anticipates, however, that additional taxes found to be due will exceed, by several times, the amount of overpayments disclosed for which refunds will be made.

The Natural Resources Division saw several important changes in personnel during March. Orr R. Hamilton, mining engineer, resigned as chief of the Metals Valuation Section to resume private consulting practice in Washington, D. C. John Alden Grimes, assistant chief of the section, was appointed chief of the Metals Valuation Section and Frank T.

Donahoe was appointed assistant chief. Mr. Grimes, before entering the federal service, was well-known as a geologist and metallurgist. During his service with the Natural Resources Division he has supervised the work of valuing copper mines. Mr. Donahoe, prior to his employment by the government for mine valuation work, had to his credit 17 years of engineering and operating experience in copper, iron, gold, lead and zinc mines.

Other changes in the division include the appointment of E. B. Tanner to succeed C. M. Stephens as chief of the Timber Valuations Section and R. E. Benedict as assistant chief of this section.

EXPORT COAL TRADE IS REVIEWED

OCCUPATION of the Ruhr coal field by the French, with consequent decrease in its coal production, entailing as it does shutting off supplies to Italy, France, Germany, and other European countries, has caused some increase in exports of bituminous coal, according to the latest review made by the Department of Commerce.

British colliery owners and coal merchants seem to be unable to supply the increased demand for coal and coke resulting from the Ruhr situation, as not only has their production of coal reached its probable maximum, under existing conditions, but their dock capacity, which is and has been for some time the governing factor in their export trade, is heavily overtaxed.

Information received from the commercial attaché of the Department of Commerce, at London, dated February 15, speaking of the Scotch coal situation, was to the effect that on that date there were 94 vessels waiting at the chief Scotch ports, 70 of them on the east coast.

British coal exports for January were 5,611,670 gross tons, as compared with 6,070,318 tons in January, 1913; 5,794,770 tons in January, 1914, and 4,020,935 tons in January, 1922.

British production is now ranging from about 5,567,000 to 5,644,000 tons per week, compared with an average of 5,520,000 tons per week in 1913, the year of greatest production; the total production for 1922 was 259,839,000 gross tons, as compared with 286,729,000 tons in 1913.

For the year 1922, British exports were 64,198,384 gross tons, as against

24,660,552 tons in 1921 and 73,400,118 in 1913, the record year.

In 1922, the total reparation deliveries amounted to some 18,000,000 tons, as against the demands of the reparation commission for 22,279,000 tons, while the total output of the German coal field in 1922, outside of lignite, amounted to 130,664,000 tons.

There is a great demand in Belgium for coke and coking coals. The Belgian coke ovens are producing only about 70 percent of their normal output, owing to the lack of suitable coal. None is being received from the Ruhr and the British coking coals can not be obtained in sufficient supplies.

Since the 19th of January very little coke or coal has been imported from Germany, causing a greatly increased demand for the British product, which, however, can not be secured in any increased amount. This has made it necessary for French buyers, including the government, to make inquiry in this country for both coal and coke. British coal exports to France in 1922 were actually in excess of those in 1913 and twice as large as in 1921.

For the past year Italy's coal requirements have been taken care of by the import of British coal, supplemented by that received from German original sources. Now, however, Italy is looking to this country, especially for gas and coking coal, as shown by inquiries and the actual closing of a fairly large tonnage over the next three months.

Germany is apparently in urgent need of large tonnages of industrial coal. For the past year, she has been purchasing increased quantities in England, as shown by the following figures of British exports to Germany.

Inquiries have been received here for coal for Germany, one sale of 200,000 tons, over four months, has been reported as closed.

As a result of the European situation Sweden has also asked for quotations on coal suitable for locomotive fuel, but as far as is known, no actual sales have been made.

Owing to the increased demand in Europe, British exporters have cut down their shipments to South America. Some inquiries for United States coals have been from Brazil and the Argentine, although but little actual business has resulted up to this time.

As a result of the European conditions from February 20 to March 12, some 52 steamships have been closed for our trans-Atlantic coal and coke trade.

The export inquiries now being received are principally for gas, coking coals, locomotive coals and coke; current supplies at Tidewater are hampered by car shortages.

OUR COAL LABOR PROBLEM

By GEORGE H. CUSHING

WHEN THE MINERS strike for five months; when the railroads try, in the next seven months to carry the nation's coal and fall a little short; when stock piles become exhausted; and when competitive bidding advances the price on the free coal, it is but natural to charge the high prices against the miners' union.

A NATURAL ANALYSIS

When the cause of that strike is sought it is natural to study the coal labor situation separate from all other labor situations. It is quite the thing, therefore, to conclude that we have a labor movement in coal distinct from the general labor movement. It is quite as easy to assume that we must have peculiar causes for labor unrest in coal. That being true, it is to be expected that everyone try to remove those local causes. Thus it is to be expected that the student will segregate those items, in the agenda of the miners' union, which are peculiar to the American coal industry and will say that if they can be relieved, the cause of mine labor discontent will be removed. This leads to the hope that we will have an end of strikes; of resultant coal shortages and of high prices for coal.

I know that such ideas are deceptions and some other aspects of the situation convince me that the activities of the American miner are part of the world labor movement and not, properly or at all, a part of the American coal question. In support of that belief I call attention to these things:

The three outstanding struggles between the coal miners and the operators, before the World War, were the anthracite strike of 1902, the Colorado strike in 1912 and the West Virginia insurrections which extended over a long period beginning in 1912. All of them were solely and openly to compel recognition of the miners' union.

In American industry generally, the Pullman strike, the Homestead strike, the textile and garment workers strikes and the hatters' strike were also for recognition of the union.

THE ORGANIZATION PERIOD

Thus, the truly great strikes in America, prior to the World War were designed, largely, to force recognition of the unions—to force the closed shop on various industries. These might be called organization strikes. The period might be called an organization period. After the unions were established we had a series of great strikes to force the detailed will of the unions upon in-

dustry. I need not go outside the coal industry for illustrations. Before the war, in Germany, France, Great Britain and the United States, we had great strikes to win for the miners certain social concessions—workmen's compensation; old age pensions; profit-sharing, and so on. This series of strikes having been won, the miners in all countries struck to win participation in the management of plants and, concurrently, to win freedom for members of the union from discharge by the management without the consent of the pit committee. The basic idea in this whole series of strikes was that the worker has a vested

Labor in every American industry does the same as the American coal miners.

Coal miners in England, France and Germany demand the same things as the American miner. Great Britain and South Africa have proposed, with respect to coal, the same things as are now demanded by the American miner. The movement being general and the demands identical, it cannot be said that the strikes spring out of the coal question; they come solely out of the labor movement.

right in industry the instant he accepts employment in it and, having a vested right, has an equal right to a vote in the management.

After these battles had been fought conclusively, the British miners resorted to alliances between what might be called natural allies—the related unions, to force their will upon the coal industry. They wrung concessions from coal owners by bringing pressure upon other industries and the whole public. This led the British miners to form an alliance between the coal, railroad and transport workers. This device was adopted, in turn, by the mine workers of France, Germany and the United States. It did not, however, become a real force in the United States until the spring of 1922.

A POLITICAL FORCE

In Great Britain, the alliance of the three largest groups of workers, caused the labor in Great Britain to become a great national political force. This led to the interference of the English Board of Trade—the counterpart of our De-

partment of Commerce—in the controversy between the coal owners and the miners federation.

The second development was the creation of a labor party in the British parliament.

This device—the alliance of related labor groups—went the round of the countries until it appeared in the United States in the summer of 1922. Then our own Department of Commerce interfered between the miners and the operators in that great struggle of that year. This development has not yet created a labor party in our Congress. However, our Congress has begun to develop blocs which is the forerunner of the Socialist party. And the workers of America are already holding conferences for the purpose of forming a labor party. It is significant that this movement is under the leadership of the miners' union.

As a result of the political crisis caused by the demands of the coal miners, Great Britain appointed a coal commission at the outset of the world war. This coal commission made a report to Parliament. It resulted in legislation in the debate over which the question was raised as to whether that country should nationalize its mines.

Last year, in South Africa, there was an uprising of the Miners Federation. This resulted in the appointment of a commission to study the mine labor situation. That commission has made its report and the report is now before the legislative body for action. The proposal in South Africa is to nationalize the mines.

In the United States, the strike of the miners in the spring of 1922 caused the Congress to authorize the President to appoint a coal commission. That commission is now sitting and must report to Congress next September. One of the proposals is that we shall nationalize the coal mines.

ALL METHODS IDENTICAL

It is strikingly significant that in all countries the methods of procedure have thus been identical. It is even more highly significant that in all countries the so-called issues have been identical. And, it should not be lost to view that in all countries—regardless of vastly different conditions—the proposals as to cures have been the same.

Confronted by this evidence, it is impossible to say that the movement of coal labor in the United States has any direct or even indirect connection with any situation peculiar to the American coal industry. It is impossible to conclude that the amelioration of conditions

complained of will solve the American coal problem. Rather, it must be admitted that the movement on the part of the American coal miners is a part of the labor movement of the world. It will have to be treated as such, if lasting peace is to be restored.

In this connection, these facts have their significance:

The industrialists of Russia overthrew the government and established themselves in power. In Germany, the Socialists control, periodically, the government of the new republic. In France, the industrialists have been able to

fashion the policies of the government. To a measurable extent, that is also true in Great Britain. And, in America, it is obvious that the opinion of our public men is colored more and more by the propaganda of our federated labor. Thus we are not doing justice to the so-called labor question in coal unless we divorce it wholly from coal and attach it to the general question labor, where it belongs. Indeed we are not dealing with a coal question at all. We are dealing wholly with a labor movement which is world wide.

COST DATA RIGHT DENIED BY COURT

Most Recent Decision in Maynard Coal Case Refuses Trade Commission Authority to Gather Statistics

BUFFETED by adverse legal decisions at every turn in its attempt to secure authority from the courts to require industrial cost production reports, the Federal Trade Commission can hold only self-inspired hopes of success in this connection following the final decree of Justice Jennings Bailey of the Supreme Court of the District of Columbia, making permanent the injunction restraining the commission from requiring such reports from the Maynard Coal Company, the complainant in a test case.

WILL CONTINUE BATTLE

That the commission intends to battle along in an effort to upset this decree by means of appeal is evident in its preparation of a bill of exceptions, which is a necessary preliminary to carrying the case to the Court of Appeals of the District of Columbia, the commission having noted an appeal which was allowed by Justice Bailey.

The decision rendered early last month was the formal order on a verbal order recently given. By this order permanency is given to the temporary injunction previously issued. Simply holding that the commission stepped beyond the bonds of its authority in demanding the data in question, the court's decision not only permanently prohibits the commission from requiring cost figures from the coal mining industry but also wipes out the order designed by the commission to establish penalties for failure to comply with the commission's instructions.

A CORRESPONDING CASE

Action taken in the Maynard case corresponds to findings in the Claire Furnace iron, steel and coke cost-reporting case, in which an injunction was obtained three years ago against the commission. The Claire Furnace decision already has

passed through the Court of Appeals of the District of Columbia, which upheld Justice Bailey's decision, and the commission has announced its intention to appeal the case to the Supreme Court of the United States.

In both cases, it has been held that the statistics involved are not concerned in interstate commerce, and that the federal agency has no right to penetrate into the realm of intrastate affairs to secure them.

In handing down the decision, Justice Bailey voiced the opinion of the court as follows:

"The defendant (Federal Trade Commission) attempts to distinguish this case, and refers to the allegations of the amended answer to the effect that coal is impressed with a public interest, but the mere fact, if it be true, that coal is impressed with a public interest does not transfer the jurisdiction of its control from the States to Congress.

"The question is not whether a State may regulate the price and production of coal upon the theory that it is impressed with a public interest, but whether such power has been given to Congress, and I find no such power.

"The defendant seems to confuse articles shipped in commerce with instrumentalities of commerce. The power to regulate the latter does not include the power to regulate the former. Nor does the fact that an article is necessary for the operation of an instrumentality of interstate commerce make it subject to regulation by Congress.

"If this were true, Congress would have the power to regulate the production of steel, necessary for the construction of locomotives; lumber, for the construction of coaches; rubber, for the construction of springs; food and clothing for the sustenance of the train crews; in fact, there is almost no article that might not be included in this manner."

MAJOR COAL STUDIES ARE BULLETINED

PROBLEMS CONSTANTLY before the coal industry are drawn closer to solution and a wealth of new information is rendered available by co-operative tests recently completed under the joint auspices of the Carnegie Institute of Technology, the Bureau of Mines and an advisory board of coal mine operators and engineers. Results of these studies are given in a series of four bulletins just issued by the Carnegie Institute. Their issuance marks the first milestone in the serious efforts of the coal mining industry to stabilize the mining business in cooperation with an educational institution.

The subjects of the four bulletins are:

No. 1. The yield and quality of the gas, oil and other by-products of the constituents of the Freeport coal bed, Pennsylvania; by Joseph D. Davis, fuel chemist, Bureau of Mines, and Henry C. Berger, research fellow, Carnegie Institute of Technology.

No. 2. A microscopic study of the Freeport coal bed, Pennsylvania; by Reinhardt Thiessen, research chemist, Bureau of Mines, and Anson W. Voorhees, research fellow, Carnegie Institute of Technology.

No. 3. Some factors in the spontaneous combustion of bituminous coal; by Joseph D. Davis, fuel chemist, Bureau of Mines, and John F. Byrne, research fellow, Carnegie Institute of Technology.

No. 4. Corrosion tests on metals and alloys in acid mine waters from coal mines; by W. A. Selvig, assistant analytical chemist, Bureau of Mines, and George M. Enos, research fellow, Carnegie Institute of Technology.

UTAH CHAPTER ELECTS NEW OFFICERS

E. J. RADDATZ, of Salt Lake City, president and general manager of the Tintic Standard Mining Company, was elected governor of the Utah Chapter, American Mining Congress, at the annual meeting March 12. V. S. Rood, general manager of the Utah Apex Mining Company, was elected first vice-governor; W. Mont Ferry, managing director of the Silver King Coalition Mines Company, second vice-governor and H. M. Hartmann, general manager of the Ophir Hill Consolidated Mining Company, third vice-governor. A. G. Mackenzie was reelected secretary and treasurer.

Directors were elected as follows: M. R. Evans, W. Mont Ferry, H. M. Hartmann, C. E. Loose, J. A. McCaskell, E. L. Newhouse, Jr., and J. B. Whitehill.

THE FORMULATION AND ADOPTION OF STANDARDS FOR AMERICAN INDUSTRIES

BY COL. WARREN R. ROBERTS*

*Chairman of General Committee, Coal Mining Branch, Standardization Division,
American Mining Congress*

THERE ARE two separate and distinct processes in the production of a National (American) Standard. The first process concerns itself with the formulation of the standard. This is essentially a technical subject and standards are, therefore, usually created by engineers, scientists (research engineers), experienced operating men and others especially qualified for this work. It is a most important, as well as a very exacting, process, and therefore requires the patient and careful thought of those engaged in the formulation of a standard.

THE FIRST ESSENTIAL

The first essential of a National Standard is that it shall meet all the requirements of the industry for which it is formulated, and, at the same time, satisfy the manufacturers of the machinery or equipment which is to be standardized that it is to their advantage to have such a standard adopted. It is, therefore, apparent that in the formulation of a National Standard all interests much be consulted, approve of the standard and assist in having it put into general use.

This brings us to the second process in the creation of a standard, viz: The methods to be used to insure its adoption. This is the particular phase of our subject to which we will address ourselves. Other articles in this issue of the Journal will be devoted to many other interesting features of standardization. In fact, this particular issue of the Journal is to feature this subject, and we hope to present standardization to the industry in a very comprehensive manner.

Mr. Sidney J. Williams, chief engineer of the National Safety Council, has said: "While it is obviously necessary that any national standard shall possess

the highest degree of technical correctness, it is equally necessary and generally more difficult to have the said standard formulated by such procedure as will bring about its general acceptance and use, for we are still, generally speaking, a free people, and our police powers are exercised by 48 separate states, and a standard which does not rest pretty definitely upon general public opinion in the field concerned is simply no standard at all." We agree absolutely with this statement by Mr. Williams.

This essential fact was in the minds of those who organized the work of the Standardization Division of the American Mining Congress; therefore, all committees carrying on this work have representatives from the operating branch of the mining industry, representatives of the manufacturers of all mining machinery and equipment, consulting mining engineers and others primarily interested in this industry. Standards formulated by our committees have, therefore, complied with this essential requirement. But it should be remembered that, even with the broad character of our committees, they can at best include only a few men from each branch of the great mining industry. We must, therefore, use every means at our command to educate all others in this industry as to the advantages of adopting the improved practices and methods and new standards recommended by our committees. We will outline

briefly the methods by which we believe this may be accomplished.

THE BEST INSTRUMENTALITY

Publicity is the best instrumentality known for the introduction of any new thing. We must, therefore, make use of this means of bringing our recommendations to the attention of all those who should adopt them for the benefit of the industry. We can reach many by the instrument we are here using, viz: THE MINING CONGRESS JOURNAL. Others are reached through the technical and trade journals, but no printed message is so effective as the personal one. We have, therefore, planned a campaign for prescribing our work personally to as many as possible by having representatives of the Standardization Division attend meetings of the various mining organizations, such as the Coal Mining Institute of America, the State and District Institutes, the State Mine Inspectors' Institutes, Trade Associations, etc. This work is under the direction of our Publicity Committee, in conjunction with the publicity department of our Washington office.

I have been requested to present an outline of this form of publicity for the assistance of those who are carrying it forward on behalf of the Standardization Division, and with the further object of having our work presented to the mining industry in the most systematic and effective manner, and as nearly as possible from a common viewpoint. This, we hope, may conserve our energies and obtain the desired results in the shortest possible time.

OUTLINE OF PROGRAM

I think the following would constitute a representative program for the presentation of our work to those in the industry whom we desire to interest

*President, Roberts & Schaefer Co.,
Engineers and Contractors, Chicago, Ill.



and whose cooperation will be of the greatest value in securing the adoption of our recommendations.

1. A comprehensive definition of Standardization. Especially as it may be applicable to the mining industry, and including a statement of the benefits of standardization.

2. A brief review of the standardization movement in this country. Such a statement, showing the progress made in standardization in other industries, must of necessity create interest in our particular work.

3. Presentation of the work of the Standardization Division. First, by outlining just how we carry forward this work, and including a diagram, or other visual presentation of our Standardization Organization to indicate the comprehensive character of the organization that is doing this work for the mining industry.

4. Progress of our work up to the present time. This should include a review of the reports of all committees which have completed certain phases of their work, and which have been sent up to the American Engineering Standards Committee for approval; also a review of the progress reports by all other committees. Such a statement of progress would assuredly be most encouraging, as our committees have accomplished a very great deal during the comparatively short time since the organization of the Standardization Division.

5. Method of procedure in making an American standard, and including how we coordinate our work with similar work being done by other national bodies, through the Mining Correlating Committee.

Other subjects occur to me, and doubtless will to the reader, which it would be of interest to add to this list, but I believe these are the essential features of our work which we should emphasize if we are to gain support for our standardization program. I will, as briefly as possible, review each of these subjects.

BROADER SCOPE IN MINING

1. The accepted definition of standardization as used in other industries is not sufficiently broad to cover the work which the Standardization Division is doing for the mining industry. The reason for this will be apparent when you consider that the mining industry is the consumer and not the producer as applied to all machinery and equipment. Therefore, should we attempt to standardize *all* the machinery and equipment which we use, we would not only assume an immense task, but we would find we were doing a large amount of work which other industries have done or should do. Therefore, after due consideration, those who

originated this work for the mining industry laid out a program about as follows: We would endeavor to improve and standardize all the methods and practices in mining, including the application of *all* machinery and equipment used in mining; and improve and standardize machinery and equipment which is applicable *only* to mining. Also improve and standardize such parts of other machinery and equipment as seemed consistent when used in the mining industry. Also make recommendation and give specifications for the proper installation and operation of *all* machinery and equipment used in mining. This program has been very generally followed by our committees with most excellent results.

2. I believe this subject is to be treated in another article in this issue of the JOURNAL. If not, you will find a review in the Standardization Bulletin for 1922.

3. You will find a review of the work of each of the Metal and Coal Branches of the Standardization Division, by the respective chairmen of these branches, in the new Standardization Bulletin, which will be distributed very widely to the mining industry in the near future.

4. I understand this subject will be covered very fully in another article in the present issue of the JOURNAL. My only object in including these subjects in this outline is to give in one place a *complete* program for presentation to the meetings and standardization conferences referred to in the first part of this article.

PROCESS OF APPROVAL

5. Please do not confuse this subject on the Method of Making an American Standard with the Formulation of a Standard, as discussed at the beginning of this article. We believe you will be interested in knowing just how *any* standard formulated by any of the national societies or organizations may be approved by the properly constituted authority and thus become an American Standard, or be stamped as Approved American Practice, as the case may warrant. An illustrative case will most readily give this information. When any of our committees have completed any particular phase of the work allotted to them, they report on such work, giving their recommendations and specifications, which is presented at our Annual Standardization Conference by the chairman of such committee. After full discussion in the conference, and after all changes suggested and as approved of are made, the report is then approved by the conference. Such report is then sent up through the Mining Correlating Committee to the American Engineering

Standards Committee for consideration and approval. This latter committee is the final authority for the approval of any standard that is to be considered an American Standard.

This committee does not *directly* consider such a report, but, instead, refers it to the Mining Correlating Committee. This committee was organized by the American Engineering Standards Committee, for the express purpose of receiving all standards offered by any society or other organization relating to the mining industry. This Mining Correlating Committee is composed of representatives of all societies and organizations interested in standardization as applied to the mining industry. When this committee, so broadly representative of the mining industry, has approved of any standard, or set of standards, as are included in our reports, they so signify to the American Engineering Standards Committee. This committee then approves the report and it becomes an American Standard or Approved American Practice. This stamp of approval has but one value, viz.—that those interested in the standard, and having in mind its adoption, know that it has been formulated by those most competent for such work, and that it has been reviewed and finally approved by the properly-constituted authority.

THOROUGH AND EXTENSIVE.

We are happy to record that the mining industry is carrying forward, through the Standardization Division of the American Mining Congress, a program on standardization as extensive and as thorough as is being done for any other industry in this country. If through the means we have outlined in this article, or by any other methods, the mining industry can be convinced of the vast benefits that accrue through standardization and will put into practice the recommendations contained in the reports of our committees, economies will result to the industry which will repay many fold for all the faithful work of the men who have given so freely of their time and energies to this important work.

BURTON BUNCH RESIGNS

BURTON BUNCH, western secretary of the American Mining Congress for more than a year, now is located in Salt Lake City, where he is connected with a promising industrial enterprise. Before becoming western representative of the Mining Congress, which post he resigned last month, Mr. Bunch was secretary of the New Mexico Chapter of the organization, and also secretary of the Southwestern Good Roads Association, with headquarters at Silver City, New Mexico.

Mr. Bunch's successor as western secretary has not been named.

THE PRACTICAL PROBLEM OF STANDARDIZATION FOR THE METAL MINING INDUSTRY

BY CHAS. A. MITKE

National Chairman, Metal Mining Branch, Standardization Division, American Mining Congress

THE EVOLUTION of standards for various lines of industry is such a comparatively recent development, most recent of all for the metal mining industry, that doubts concerning the practical application of standards to mining, and ensuing benefits, are pardonable.

At a recent meeting on Standardization, Dr. George Burgess (representing the Bureau of Standards), recalling the time when the consideration of the establishment of this bureau was before Congress, stated that at the hearings a distinguished physical scientist, when asked by the committee of what use a Bureau of Standards might be to the public, replied (and this is the only thing he could think of), that "they might calibrate thermometers." Yet, who, upon reviewing the excellent work of Dr. Stratton and his colleagues during the past years, would think of setting the calibration of thermometers as the culmination of their efforts.

AN OUTLINE OF BENEFITS

The question has often been raised—"What benefits can possibly result from standardization as applied to metal mining?"

To this I might reply first by quoting from a recent article by Dr. P. G. Agnew, Secretary of the American Engineering Standards Committee on "What Standardization Does," and, second, by pointing out a number of practical illustrations in the mining industry itself.

In the article referred to, Dr. Agnew states, with reference to standardization:

1. It is one of the principal means of getting the results of research and development into actual use in the industries.

2. By bringing out the need of new facts in order to determine what is best, and to secure agreement on most questions, it acts as a powerful stimulus to research and development—and it is thus in decided contrast to crystallization resulting from fixity of mental attitude.

3. By concentrating on fewer lines, it enables more thought and energy to be put into designs, so that they will be more efficient and economical.

4. It eliminates indecision, both in production and utilization, a prolific cause of inefficiency and waste.

5. It helps to eliminate practices which are merely the result of accident or tradition, and which impede development.

Turning now to the metal mining industry itself, we find evidences of the

advantage of applying standard methods and practices to the various details which compose the entire operations.

Take, for example, the question of timbering underground. Before standardization was attempted, it was the custom for the shift boss, or foreman in charge, to have a great deal of framing done underground by hand. In many instances, where the ore formation was irregular, instead of taking out sufficient ground to put up a standard set the timber was cut to fit the opening left through extraction of the ore. As a consequence, a great deal of variety as to size and shape of timber sets existed, and a firm belief prevailed that individual judgment was absolutely necessary in each and every case. Such variation naturally entailed a great loss of time and expense in cutting and framing these different-sized timbers.

IMPELLED AN INVESTIGATION

High mining costs impelled an investigation when it was found that, after all, the individual judgment of the miner or shift boss was not absolutely essential in such instances, and that in most cases it was far cheaper to remove sufficient ground to make room for standard timber sets, which might be cut and framed on surface by machine, rather than cut the timber by hand underground to fit the particular opening in question. As a consequence, in a great many mines practically all the timber used underground has been standardized and framing and sawing by the miners themselves, has been almost entirely eliminated. This has resulted in a considerable saving both of money and time, and it may be said that at present approximately 50 per cent to 90 per cent of the timber now used underground conforms to certain standards.

Another item to which standardization has been successfully applied is the reduction in the number of different kinds and sizes of drill steel used underground. It was no uncommon thing in past years for companies to use as many as seven different kinds and sizes of drill steel. As a result, endless confusion existed, as a miner would leave his working place and go perhaps a quarter of a mile to the steel rack, get some steel and return, only to find he had brought the wrong kind of steel for the machine he was using. This necessitated a return to the steel rack and a further delay while he selected the size and char-

acter of steel to fit his machine. Now, many companies have reduced the number of types and sizes of drill steel in use in their mines to three, and some of them have advanced so far as to cut this to two and even one.

Successful attempts have been made at a number of properties to classify the ground, and standardize on several types of machine rounds, suitable for use in over 90 percent of the ground. It has been found that by the continued use of these rounds there has been a considerable saving in the number of drill holes used, the time involved in drilling the round, and in the amount of powder used—that is, less powder is required per foot of ground broken. Moreover, by the correct placing of holes, the men can pull more ground in the same time than formerly, thus becoming eligible for the bonus offered by the companies for increased production over and above the average day's work.

ANOTHER SOURCE OF SAVINGS

Concentration on stoping methods, in order to introduce simplification and systematization in planning the extraction of ore and the elimination of excessive hand work by arranging for ore to be extracted from stopes and waste to be returned as fill, through gravity methods, has also resulted in beneficial savings.

These are merely a few of the satisfactory results obtained through the use of standardization in metal mining.

There still remains much to be accomplished. Granted that some few exceptions exist where the miners must use individual judgment, there still remains an enormous field for the establishment of well-regulated routine based on standard practices. Standards are not merely theoretical production, but are a selection of the very best practices and experiences, and, as such, represent the best that is known in any line at the time they are evolved.

The work progresses steadily but slowly, for the reason that the average practical miner and shift boss still maintain the idea that in each and every case, regardless, individual judgment is superior, and should prevail over standard practices, based on technical knowledge and experience. To overcome such impressions and prejudices takes time, but standards are on the increase, and, ultimately, standard practices, based on solid foundations, will win out.

One company, realizing the difficulty

in overcoming the prejudices of the practical miner, maintains an underground school where all new men are sent for their first three or four days, or longer, if they can be spared. There they are not only given an idea of company policies, but are taught how to set up their machines and drill a standard round; how to put up a standard set of timbers, and the other standard practices in use in that mine. Upon leaving the school, they are placed under the supervision of a boss who understands and uses standard methods, and in this way their education continues until they become useful and valuable members of the organization. Not only does this training benefit the company, but the men also benefit by it, and there are miners on the payroll of this corporation who, by using the approved standard practices, are drawing daily incomes of \$10 and \$12 (which includes day's pay and bonus).

VAST WASTE INDICATED

The much discussed "Elimination of Waste" report of the Federated American Engineering Societies, indicated 40 per cent of capital, of thought, and of labor in six typical industries wasted—and one of the major causes of this waste—lack of standardization.

Representatives of the Department of Commerce state that "The tremendous economies through standardized machines and equipment have long been one of the outstanding superiorities of American methods in contrast with those of European and other foreign nations, but, while we have obtained some of the advantages in special instances, the nation as a whole has continued to suffer from the enormous wastes of over-diversification and individual variation." This might also be said with truth of the mining industry, in which a great diversity of equipment and methods still prevails.

A glance at the daily papers will convince the reader that standardization is a live subject at the moment in all lines of industry. Such headlines as "Unmuddle our motor regulations by the use of standard signals"; "Fewer makes and more standardization among motor cars"; "Standardization of speed limits for urban, suburban and country driving"; "Standardization of lights and colors for semaphore and crossing signals"; "Standardization of Government contract forms"; "Paving brick industries reduce from 66 to 7 recognized standard sizes of paving bricks"; "Various bed industries will limit bed sizes to one length and four widths"; "Lumber dealers meet to discuss

standardization," etc., etc., meet the eye from time to time.

MOVEMENT IS GENERAL

In industries other than mining, standards are, therefore, being sought, not only by individual producers, but by states and governments. To quote from an article on "The What and Why of Safety Codes," by Sidney J. Williams, chief engineer of the National Safety Council:

"A year or so ago, the New Jersey Department of Labor wanted to bring up to date its requirements for the guarding of belts, gears, shafting, and other transmission apparatus. At that time, a national standard on this subject was being developed as one of the forty projects under the guidance of the American Engineering Standards Committee, and the chief mechanical and electrical engineer of the New Jersey Department was a member of the sectional committee. New Jersey, therefore, held up the independent formulation of a code which it would otherwise have undertaken, and awaited the results of the national effort. As soon as the national code had been proved by the American Engineering Standards Committee, the national standard was adopted verbatim and in toto by New Jersey. In Pennsylvania, likewise, the revision of obsolete standards has been largely guided by the national program. If the value of national standardization is thus recognized by some of the most important industrial states whose labor departments are well equipped to operate independently, how much more valuable must they be to the smaller states and to those which are just embarking upon a policy of definite protection for the lives and limbs of their workers.

National standardization of safety codes, which, three years ago existed only as a paper program and in the minds of a few enthusiasts, is now an accomplished fact. There are, of course, still some scoffers, some who prefer to play a lone hand; but their number becomes less each year. There are still difficulties in coordinating and regulating the dozens of projects now under way, but these are being and will be overcome, because the men who make up the machine are working for no selfish interest except the accomplishment of a public service in which they all believe. In short, safety standardization, and the greater work of the American Engineering Standards Committee, of which it forms a part, are now a recognized and important cog in the extra-political government of American industry, which is slowly smoothing out the wrinkles of inefficiency and confusion, always associated with the individual freedom of a democracy."

Costs are a vital factor in metal mining, and the best method of reducing costs is through the introduction and use of standard equipment and approved standard practices. A glance at the following compilation from the Federal Trade Commission, giving the allocation of production of copper in 1918, according to cost per pound, and which appeared in the September 1, 1921, issue of the Arizona Mining Journal, is most interesting:

Range of cost	Companies	Pounds production.	Per cent of total.
Less than 12c	2	122,245,051	9.24
Between 12-13c	4	208,571,191	5.41
" 13-14c	4	314,553,177	13.93
" 14-15c	4	359,617,743	15.92
" 15-16c	2	98,307,293	4.35
" 16-17c	8	460,528,645	20.39
" 17-18c	9	255,399,696	11.32
" 18-19c	3	72,373,388	3.20
" 19-20c	5	28,491,436	1.26
" 20-21c	5	36,871,193	1.63
" 21-22c	9	135,538,602	6.00
" 22-23c	3	60,861,465	2.70
" 23-24c	5	44,919,772	1.99
" 24-25c	1	6,230,694	.28
" 25-26c	3	7,605,224	.34
" 26 & over	18	46,119,555	2.04
Total all companies	85	\$2,258,234,125	100.00

These costs are based on 1918 figures, which was the last year characterized by large production and high costs. While costs are much lower at present, nevertheless, the above figures are suggestive.

WILL FACE COMPETITION

Within the near future, the copper producers of the United States face keen competition from South American producers. One company alone, with one of the largest and most valuable known bodies of copper ore in the world, will soon become a formidable competitor. This company has a present production of 180,000,000 pounds copper per annum, and extensions are under way providing for an increase to 225,000,000 pounds per annum by April of this year. It is also stated that plans and estimates already prepared indicate that production can be increased to 450,000,000 pounds per year by moderate capital expenditure. Even at this tremendous rate of production, the ore reserves already developed would be sufficient to last for over fifty years.

The official figures state that on a market of 15-cent copper, this company should show an average profit of 8 cents per pound before interest, depreciation and depletion.

The natural advantages enjoyed by the company, its proximity to ocean transportation, its supply of labor, and the fact that this great tonnage lies near the surface and can be mined by electric shovels, makes it peculiarly adaptable for the application of standard methods.

To compete with such a powerful and low cost



producers, it will be necessary for the copper producers in the states to avail themselves of the benefits of standardized equipment and standard practices to the uttermost limit.

DATA WILL BE VALUABLE

In an attempt to compile statistics and exchange experiences, in order that approved practices and tentative standards may be evolved, which will then be made available for the benefit of all, a number of experienced mining men have joined together, under the sponsorship of the American Mining Congress and in connection with other interested societies and bureaus, are contributing their services and experiences faithfully and without other reward than the hope that ultimately the industry as a whole may benefit from their efforts.

As stated by Professor E. A. Holbrook (then assistant director of the U. S. Bureau of Mines) in an address before the 1921 Standardization Conference, "The true meaning of standardization is as little understood as the true meaning of the word 'theory', and yet the two have much in common. Theory is a digest of accumulated experience; a safe starting plane on which to base new practice by providing the background of accumulated experience. In the same way, standardization, the universal adoption of the best, is practice based on a digest of accumulated experience. A safe and workable basis on which to carry out the best practice.

"For the development of better theories, research and investigation is needed. Likewise, if standardization is to be truly representative, some body of men must investigate the unusual and little-known factors and prepare data on the fundamentals of the subject before a real standard can be built up. This research is not necessarily a laboratory investigation. Your Mining Congress, through its technical sub-committees, is as truly doing research and investigational work as is a chemist buried in his laboratory. By bringing out and sorting the accumulated experience of their membership, the committees are laying the only real basis on which standardization can be built."

TARIFF REPORTS—Reports of the Tariff Commission on changes in duties on articles on which it recently announced it would conduct investigations under the flexible tariff provision will not be made within a year. It is understood that higher duties have been requested on pig iron, oxalic acid, diethyl barbituric acid, sodium nitrate, and barium dioxide while applications for increased and lower duties on potassium chlorate have been made by different interests.

TAX STATISTICS INDICATE DISCRIMINATION

ALWAYS IN a position between the devil of holding down expenses to prevent popular outcry and the deep indigo sea of meeting government expenses, Uncle Sam is perpetually hard put in his revenue affairs. His entire problem resolves itself into getting the money mainly from those sources which for one reason or another will not evidence an extreme reaction upon being parted from a portion of their revenues. Perhaps it is something on the order of this adjustment that results in some industries apparently furnishing more than their shares of the revenues for federal, local and state taxation as compared with the amounts of money turned into the public till by other industries.

SUFFICIENT EVIDENCE AVAILABLE

At any rate, sufficient evidence is fast accumulating to show that the mining industry and the railroads are furnishing a much greater proportion of their income to the government than is the agricultural industry, for instance.

Farm tax figures just released by the Department of Agriculture are interesting when compared with those of the mines and railroads. Farm taxes were 126 per cent greater in 1922 than in 1913, according to the department's estimate. Recent figures on mine and railroad taxes indicate that mining enterprises have borne an increase in federal, state and local taxes of more than 1,300 per cent since 1912, while the railroads during the same period sustained an increase of 178.5 per cent. Western railroads suffered a heavier increase than those in the eastern and southern districts, amounting to 208 per cent.

While farm taxes were increasing, the value of agricultural lands and farm property grew from 40 billion dollars to 77 billion dollars, indicating that values kept pace with the increase in taxes. On the other hand, while taxes on mines and railroads were climbing, values did not increase proportionately. The ratio of increase in taxes as compared with values was approximately as follows: farms, increase in taxes, 126 per cent; increase in values, 90 per cent; mines, increase in taxes, 1,300 per cent; increase in values, 120 per cent; railroads, increase in taxes, 178.5 per cent; increase in values, 25 per cent.

One reason for the wide difference between the figures for farms on the one hand and the mines and railroads on the other, is that the farms pay a negligible tax to the federal government under the income tax laws. The mines and railroads have been forced to pay, in addition to the enormous increase in state

and local taxes, a very high federal tax. In view of the condition of affairs which these comparisons disclose, it appears that the Department of Agriculture unwittingly has made an excellent case for the mines and railroads against the excessive, burdensome and discriminatory methods and rates of taxation which are now being imposed in many of the states on these industries, particularly in states where agriculture is the dominating industry.

The cost of maintaining federal, state, county city, town and village governments has increased from less than 4 billion dollars in 1912 to 8.5 billion dollars in 1922. Taxes imposed by these governments must be adequate to meet this enormous annual bill. Each industry should bear its fair proportion, and no industry should be discriminated against.

It appears, however, that corporate enterprises, in 1920, paid approximately 40 per cent of the aggregate state and local taxes, and 59 per cent of the total federal income and excess profits taxes collected. These corporate enterprises, mainly mining, transportation and manufacturing, constitute less than 25 per cent of the total national wealth as computed by various authorities.

STIFLE LOCAL MARKETS

In discriminating against the mines the states in which such conditions exist are stifling local enterprises and are destroying local markets for agricultural products. In levying an unfair portion of the necessary increases in taxation against the railways, state and local governments are defeating efforts which are being made to reduce freight rates and provide more adequate service. In most instances, the situation is controlled by the farmers, who hold safe majorities in state legislatures and a powerful bloc in Congress.

Taxpayers have the right to demand fair treatment. Occasionally it may be advisable to favor an infant or struggling industry by not subjecting it to increased taxes. But, generally speaking, increased taxes should be spread over all taxable resources alike. Farmers, who benefit from expenditures for good roads, should not object to paying their share of the bill. Statistics seem to indicate, however, that mining, railway and manufacturing enterprises are being forced to bear the brunt of the burden, which means that the added cost is reflected in the price the manufacturer pays for raw products of mines, which, in turn, is reflected in the prices paid by the railroads for steel rails and equipment, which, in turn, is reflected in freight rates.

STANDARDIZING METAL MINE FIRE PROTECTION

Adoption of Simplified Equipment and Practices is Additional Guarantee of Safety of Lives and Property—Real Interest Awakening in Work of This Type—Equipment Maintenance is Highly Important

BY WILLIAM CONIBEAR*

Safety Department, Cleveland-Cliffs Iron Co., Ishpeming, Mich.

IF A CRITERION of the status of the fire-fighting equipment of the metal mines in this country were available it would probably indicate that the maintenance of adequate equipment for fighting the fires that may originate underground is an exceptional condition rather than the general rule. An operator has no alternative but to equip his mine with the latest types of rock drills, mechanical loading devices, etc., if he expects to meet keen competition and show a profit for marketing his ore, but the necessity of equipping with fire-fighting appliances is regarded too often as optional rather than imperative. Fortunately, the progress of the mining industry in recent years has not been unproductive of improvement with respect to mine fire hazards. Steel headframes, concrete shafts and stations, safe installation of electric wires and appliances, mechanical control of ventilation, etc., add to the permanency of the equipment of a mine and ultimately represent economy in the production of its ore, and operators have recognized that they also reduce the source of fire-hazards and thereby provide protection against loss of life and property. This consideration therefore has been a potent factor in warranting the large expenditure of money that these improvements cost.

PUBLICITY IS INCENTIVE

The publicity that is being given to mine fire-hazards is doubtless a powerful incentive in bringing about conditions that are providing greater safety for men who work underground, but, nevertheless, the importance of maintaining ample fire-fighting equipment, regardless of the extraordinary preventive methods that may be enforced, cannot be



William Conibear

over-emphasized. Unpreparedness to fight fire is a condition that does not conform to the best American standards of mine operations. Fire should be recognized as a menace that continuously hovers over a mine, and, sooner or later, may descend and take toll in a heavy loss of life and property.

It is my opinion that in the history of mining never was there a better opportunity than exists at the present time for the men who are in charge of the fire-fighting equipment of metal mines to work for higher standards in equipment. Many operators are enlarging their equipment, others are beginning to equip their mines, and many more are giving the subject serious consideration. Some are groping in the dark because of the lack of information as to essential equipment, the amount that should be maintained, approved methods of installation, etc. This lack of information retards progress, and, it is feared, in many instances, has negated the work entirely. Although it is understood that every mine presents separate and distinct fire-hazard problems, requiring special study and treatment, there also are many hazards that are common to all mines. The latter are more numerous than the former, and hence there is ample opportunity to work for the standardization of those appliances that should be maintained at every mine in order to combat the fire hazards that are characteristic of the industry as a whole.

A STEADY GROWTH NOTED

During the past ten years there has been such a steady growth in the use of self-contained oxygen apparatus by the mining industry that the opinion is practically unanimous that it is an important part of mine fire-fighting equipment. The Bureau of Mines has published sufficient information to guide operators in the selection of suitable apparatus, and it has also outlined an adequate and very thorough training course, so that it is possible for operators to qualify employees in its use. The investigations of the various types of apparatus made by the Bureau of Mines and the amount of rescue-work that it has done and training that it has given have been so important that there can be no question raised as to the value of the standards that have been recommended. Mr. D. J. Parker, chief engineer of the Mine Safety Serv-

ice, U. S. Bureau of Mines, is the writer of a paper on "Mine Rescue Training and Operation," in which he has outlined these requirements, and the National Safety Council has published his paper under the title "Safe Practice Pamphlet No. M. 2." The members of the Committee on Metal Mine Fire-Fighting Equipment for the American Mining Congress are unanimously of the opinion that the requirements that have been outlined by Mr. Parker in his comprehensive report must be met in order to provide and maintain properly this important unit of a mine's fire-fighting equipment; that they represent standards that should be acceptable to all operators; and that there is no need at this time to recommend standards other than are embodied in this report.

Chemical fire extinguishers are an essential part of the equipment, and should be kept under ground at shaft stations, pumps houses, locomotive rooms, powder magazines and in dry-timbered drifts distant from the shaft. Types are manufactured that vary from small portable hand-size to large tanks that have to be mounted on trucks for rapid transportation. An extinguisher, regardless of type or size, is a single fire-fighting unit in itself, and, as such, is a valuable adjunct to the fire-fighting equipment of a mine, if always available for use and kept in first class condition. The small carbon tetrachloride type is recommended for all electrical installations, but the acid-soda and fire-foam types are preferable for other places.

UNDERGROUND CONDITIONS

A study of the various types of fire extinguishers and the conditions underground where it may be necessary to use them, makes apparent no need for standards other than have already been adopted. Fighting a fire in an incipient stage underground is not altogether unlike fighting one on the surface, and the many types and sizes that are being used throughout the land and that are apparently giving satisfactory service should be accepted as sufficient proof that an attempt to standardize a limited number of types or sizes for underground purposes would be futile.

The system of water supply that will be installed in a mine for fire purposes will probably be determined by the mine manager, whose judgment will be in-

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fluenced largely by the number and the degree of the mine's fire hazards and also by the mine facilities that can be utilized most readily and economically. There are mines having such extremely low fire risk that the menace to life and property practically is nil, as is the situation in many open pit mines, but where mining is in progress a mile or more from surface the hazards are often so apparent that the manager logically should accept no alternative and install an efficient water system as an essential unit of his fire-fighting equipment. Fire risks between these two extremes vary so exceedingly that action toward proffering recommendations for a standardized unit or units must not be hurried. It is easy to suggest that the ideal system is the installation throughout the mine of a separate pipe line, drawing on the surface plant for water; or to recommend that, if the flow of water in the mine is heavy, it will be found feasible to tap the discharge column and convert the air line into a water-line, with the proviso that this method is safe if the discharge pipe is carried to surface through a fire-proof shaft in which the air current is downcast; or to advise equipping with large portable water tanks, hose and fittings, mounted on trucks for rapid transportation. The solution of the problem may be simple or difficult, but it is apparent to the writer that rules and regulations for a standardized unit cannot be forthcoming that will be found applicable to the entire industry. It is surely a practical recommendation, however, to suggest that water under pressure should always be provided as a measure for fighting fires underground.

PROVEN ESSENTIAL

The fire fighters of villages, towns and cities have found it essential for mutual cooperation to standardize the size of hose, the thread of couplings, nozzles and hydrants. The International Firemen's Conference recommended 2½-inch hose and 7½ threads per inch, and these standards have been adopted by many fire departments since then. Mines that are located within municipal boundary lines must have the surface water mains connected with the municipal water plant and all hydrants must be equipped with standard thread to qualify for the protection of the local fire department. Consequently, there is a tendency to equip with similar appliances for underground fire work. Many

mines, using water Leyner rock drills, have found it practical to standardize on a small-size hose for fire-fighting, and thus the hose used for drill work can be made to serve two purposes, ½-inch and 2½-inch hose are the two sizes most commonly used, and, with few exceptions, are the minimum and maximum sizes used for underground fire equipment.

It does not necessarily follow that, because the fire hose for fighting fire underground is the same size as that used on surface, the mine operator possesses a better equipment than would

visible to recommend, at least tentatively, hose two inches or less in diameter and water pressure not exceeding fifty pounds.

IMPORTANCE OF AIR CONTROL

There has been proportionately a large loss of life in fighting mine fires because men did not know that many of their methods of attack would reverse the direction of the air current, or because they were unable to control the air circulation at the start of a fire. It is not only the disadvantage of fighting below surface and in a restricted area that handicaps the work, but the problem of controlling the flow of poisonous smoke and gases adds to the complexity of the situation. Measures that assure the continuity of air currents in a definite direction must be established not only for the safety of men who may be in the mine when fire occurs, but also for the safety of the men upon whom the responsibility falls to fight the fire. It has been demonstrated in a number of metal mine fires in the southwest that the work of fire-fighters can often be made less

hazardous and more rapid with the use of mechanical ventilation, because it is possible, by extensive use of bratticing, to work near a fire-zone in fresh air and free of the burden of oxygen apparatus. The work of controlling the movement of smoke and gases and restricting them to limited areas is further advanced by the installation of permanent fire-doors at the collar of shaft and shaft stations and other strategic places, and also by the maintenance of material for building bulkheads, when in time of emergency they may prove to be beneficial. Miners are supposed to be familiar with the second outlet of a mine, but if the air currents are subject to changes when a fire occurs, either the main shaft or second outlet may prove to be a passageway to an untimely death instead of a retreat to a safety zone. Without mechanical control air currents may be variable, in conformity with atmospheric changes, and hence men cannot be instructed beforehand in the direction that they should travel when warned there is a fire.

A FACTOR IN COST

Good air control is an important factor in the cost of production, and this significance has brought about the many efficient ventilating systems that are to be found in operation today at metal



View of Cliffs Shaft Mine, Ishpeming, Mich., showing modern fire-proof shaft houses. The insert gives a closer view of one of the houses

be the case if unlike sizes of hose were used. On surface fire may be attacked in the open, where large hose and heavy water pressure are often the prime requisites to prevent a large conflagration. On the other hand, there are many places in the average metal mine where a large hose would prove too cumbersome for speedy and efficient work. The man-power available when fire occurs is also worthy of serious consideration. Fire originating in a mine between shifts may be discovered by a watchman or a pumpman, who is very apt to tackle the job of extinguishing it alone, acting under the apprehension that the danger zone increases rapidly with the spread of smoke and gas. On surface, as a general rule, delay in an attack on a fire does not lessen the safety of the firemen, although it may increase the magnitude of the work that confronts them. When a fire in a mine has reached an advanced stage, similar to one on surface requiring a large volume of water under high pressure in order to be fought successfully, it is a safe deduction to conclude that some other method of attack must be employed to combat it. It appears to be the consensus of opinion that one or two men should be able to manipulate the stream of water that is kept underground and because of this contention it has been thought ad-

mines. The history of a few mine fires has demonstrated that, when the ventilating system has been properly designed and ably managed, it becomes an indispensable fire-fighting unit during the critical period of a fire, but that otherwise it may prove to be an appliance that fans the fire and adds to the number of fatalities sustained. Experience has shown that it is equally important that the control of ventilation be studied with reference to the possible results in time of fire as well as the benefits that accrue by providing better working conditions.

The Committee on Metal Mine Ventilating Equipment for the American Mining Congress made an excellent report last year on the subject of standardization of metal mine ventilating equipment and practices. Although the standards embodied in that report are offered primarily for ventilating purposes, many of them are applicable as standards for fire-fighting equipment. It is the work of the Committee on Metal Mine Fire-fighting Equipment to outline essential equipment that should be maintained in order to prevent interference with a rapid attack on a fire by fluctuations in air currents. Briefly, the committee has under consideration the control of ventilation by either fans or blowers, the erection of firedoors at shafts, shaft stations and elsewhere, the maintenance of bulkhead material, etc.

OTHER ESSENTIAL STANDARDS

Safe and effective use of underground fire-fighting appliances at the beginning of a fire prevents a possible loss of life and property, and to insure a reasonable probability that these methods will be pursued by fire-fighters certain standards in equipment and organization are essential, in addition to those already outlined. Briefly, these are:

1. All fire-fighting apparatus should be regularly inspected and tested at frequent intervals.
2. A well-trained corps of fire-fighters should be organized.
3. At each mine a man should be designated fire chief who will take charge of all rescue and fire-fighting work until relieved by the mining captain or superintendent.
4. At each mine definite plans should be made and set down in writing as to the procedure to be followed in case of fire in any part of the mine; copies of the plans being given to the fire chief, mining captain, superintendent and safety engineer.
5. Two systems of signalling fire danger from underground to surface should be maintained, one of which should be a pull-bell device.
6. A system of warning men to stop work immediately and to start to surface, notifying all others who are not in a position to receive the warning, should be adopted. The stench system has been highly recommended.
7. Passageways to the second outlet

should be clearly marked and all men trained to follow them. In mines with electric lights, red lights should be placed at all ladder-roads and drifts leading to the second outlet. Suitable signs of warning and directions should be posted at all advantageous places.

8. Special instruction should be given to all underground foremen and bosses in the proper mode of action to be followed in case of a fire underground in any part of the mine.

Standardization of fire-fighting equipment and training methods is recommended because it insures economy and efficiency. Unlike other equipment, fire-fighting equipment is not usually subjected to constant or frequent usage. It deteriorates under unfavorable atmospheric conditions, but the same depreciation occurs to a greater or less extent in all equipment underground. The amount of money that must be spent annually to keep it in first-class order should be regarded as a small premium to pay when compared to the value of the property at stake, not to mention the inestimable value of the lives that may be endangered by a fire. If a large company uses standard hose, couplings, fire doors, etc., it is in a position to salvage practically at full value this equipment when the time comes to abandon a part of a mine or the entire mine, as it can be installed in the newly developed stations and drifts of other properties. Many men seek employment from one mine to another mine, and if they have been trained to use standardized equipment the industry loses less manpower for fire-fighting purposes. Two or more companies operating mines that have underground connections are in a better position to render mutual cooperation in time of fire if they have adopted like equipment than if each mine is equipped with appliances that are not interchangeable. Likewise, it is thought that if all the mines in a district have standardized their equipment there is afforded thereby an opportunity for united effort to safeguard life and property that cannot be gained if dissimilar appliances are maintained.

HANDICAP TO PROGRESS

The work of the Committee on Metal Mine Fire-Fighting Equipment has progressed slowly because there has been a reluctance on the part of many mining men to advance the information that should be available in order to compile standards that will meet with general approval. It is not expected that a committee consisting of few members should assume the responsibility of formulating standards on this important equipment without the active cooperation of the majority of metal mine operators, and, moreover, unless such information is forthcoming, a satisfactory report is not possible.

It has, however, been decided to make

another attempt to obtain the desired data, and, with this object in view, two sub-committees have been appointed; one to study the control of ventilation with reference to mine fires and the other to work out standards in hose equipment. The personnel of the main committee has been increased and the new members are men whose qualifications lend assurance that more fruitful results will be obtained. Signs that indicate the awakening of a real interest in this subject are not lacking, and, in recognition of this fact, more attention has been given in this article to the value of maintaining equipment than to the significance of standardization.

No attempt has been made to outline herein fire preventive methods nor has it been the object to give a summary of all the units that should be utilized to meet the many fire-hazards that are known to exist at the metal mines.

CURRENT OIL SHALE BIBLIOGRAPHY

Alderson, Victor C.—Oil Shale, A Résumé for 1922. Oil Shale Bibliography for 1922, Colorado School of Mines Quarterly, January, 1923, Supplement B, pp. 1-28. Mining Congress Journal, February, 1923, p. 60. Railroad Red Book, January, 1923, pp. 9-22. Mountain States Mineral Age, January, 1923, pp. 33-35.

Bailey, Edwin M.—The Shale Oil Industry of Scotland, Journal of the Institute of Petroleum Technologists, London, October, 1922, pp. 465-490. Canadian Oil Shale, Canadian Mining Journal, February 9, 1923, pp. 111-112. Current Bibliography, Mining Congress Journal, February, 1923, p. 60.

Day, David T.—The Torbanites of Nova Scotia, Oil Engineering and Finance, London, January 13, 1923, pp. 37-42.

Goodwin, Ralph T.—The Organic Content of Oil Shales, Colorado School of Mines Quarterly, January, 1923, Supplement A.

Magee, Robert E.—Shale By-Products Industry, Mountain States Mineral Age, January, 1923, pp. 37-38.

Oil Shale Industry in 1922, Petroleum Times, London, January 20, 1923, p. 90.

Oil Shale Current Bibliography, Mountain States Mineral Age, January, 1923, p. 36.

Nielsen, Harald—Low Temperature Carbonization, Part II, Beama, London, January, 1923, pp. 28-36. Oil Shales of Australasia, Petroleum Times, London, January 13, 1923, p. 46. Oil Shale Developments in Esthonia, Petroleum Times, London, January 27, 1923, pp. 127-8.

Rae, Colin C.—Organic Material of Carbonaceous Shales, Bulletin of the American Association of Petroleum Geologists, Vol. 6, No. 4, pp. 333-341, 1922.

Ritter, Etienne A.—Distillation of Oil Shales at Puertollano, Spain, Engineering and Mining Journal Press, February 17, 1923, pp. 326-7.

Manchester, Dean E.—Distribution and Importance of the Oil Shale Deposits in the United States, Railroad Red Book, February, 1923, pp. 378-9; Petroleum Times, London, January 20, 1923, p. 84.

A Series of Scrutinies Directed Toward Current Events IN WASHINGTON TOWN



By

IRA L. SMITH



MAROONED on the Island of Insomnia by the churning waters of sleeplessness, there seemed no chance for escape to the Land of Snooze. As I peered into the distances, I saw a moving speck approaching me through the air, as though from the end of the universe.

It speedily came closer and soon I was able to make out the form of a Congressional Record. Reaching a spot directly over my head, it circled round and round, then winged its way down, fluttering gently to my side.

I felt certain it had come to carry me away, for Congressional Records were reputed in the earliest folklore to have been created for the sole purpose of transporting men to the distant realm

where nods abound. Fact of facts, it seemed but a moment after I had laid my first fondling touch upon the Record until I was high and well on my way to the Land of Snooze, which soon was to enshroud me in its haze of drowzes.

Just as my eyes closed, I entered a dream, in which I at first could not discern my surroundings. When the dimness became more familiar, I discovered I was in the first session of the Sixty-eighth Congress, somewhere in the forefront of 1924.

Peering still more deeply, I saw a group of gesticulating forms that moved around in a mass of tepid air. Even their smallest moves, as they assumed first one posture and then another, were most distracting to me, for it appeared certain that they might lose their heads, which were rather loosely fastened to their shoulders, in some instances being held in position by only one or two strong principles, when several usually are necessary.

I drew closer to them and by chance remarks that drifted to my ears, I gathered that the group consisted of sixty or more representatives and at least eight or ten senators who, by reason of an election tussle, had come into possession of a mystic wand called the "balance of power." It was then I realized that these debating spirits were of the ilk known in politics as radicals.

Before the session opened, so I came to understand, these individuals, bearing the brand of one political party or another but refusing to jump through hoops for either, had agreed among themselves to wave the balance of power majestically when once they gained possession of it, and by this means transform into realities their pet legislative theories.

They were aiming at enactment of legislation for prevention of future wars, farmer legislation, adjustment of the tariff and tax laws, passage of constitutional amendments abolishing tax-

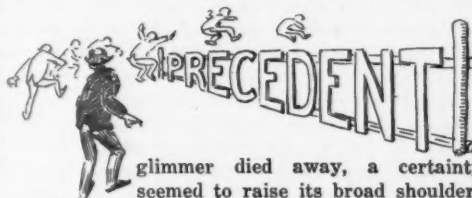
exempt securities and regulating federal primaries and elections, limitation of the authority of the Supreme Court in deciding laws to be unconstitutional, conservation of natural resources and waterpower sites, cooperative associations, transportation law revisions and soldiers' compensation.

No such small group of solons, I learned, had ever attempted such a hefty job in the hinterdays when every man was a party man. To bring such a mass of proposals out of the ineffectual domain of the tentative into the staunch broadnesses of reality is a task that well might tax any mental sinews, even those of a flock of resourceful radicals.

The solons of my dream had just started to devise the actual ways and means by which they were going to attempt the draping of the nation's law books with their innovations when my anxiety as to how they were going to fare began to drive away the vision.

I remember, however, that just as my curiosity was about to rout this dream from where I watched in the Land of Snooze, the legislators one by one were changing their characters and becoming more like the general mould of men who concoct the nation's laws under a greater or lesser degree of party influence.

It may be that as the dream vanished, my imagination sought to paint in the fading lines with its own strokes. At any rate, as I glided off arm in arm with a robust slumber, my impression was that eventually all the radicals had become as their more conventional fellows and the magic balance of power had moved by order of natural laws to suspend itself over the majority. As the fantasy's last



glimmer died away, a certainty seemed to raise its broad shoulders and declare that all the laws of the future would be drafted under the system of legislative checks and balances that ruled affairs congressional before fence-vaulting radicals became something of the mode.

THE VALUE OF IMPROVING MINE VENTILATION

Application of Standardization to Distribution of Air in Mines Forced To Assume Broad Character—Draws Upon Standardized Methods Rather Than Machinery

BY CARL H. TRIK*
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STANDARDIZATION as regards the ventilation of a coal mine is more or less a misnomer. The average man regards a standardized product or method as being exactly the same in any part of the country in which that product or method is used. Consequently one may be inclined to think that in striving toward the standardization of coal mine ventilation it is the aim of the Standardization Division of the American Mining Congress to have all mines eventually pattern their ventilating systems alike. This is, of course, out of the question, and is by no means the aim of the Mine Ventilation Committee of the Standardization Division of the A. M. C.

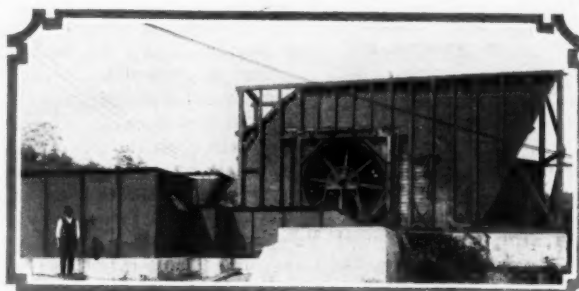
This group has been accepting standardization in its broader sense and has attempted to show the value of improvement in the method and practices of mine ventilation by making certain specific recommendations which in their experience will effect the maximum saving and obtain the greatest return to the man or men who will follow these recommendations to the full extent of their ability. Ever since the early days of coal mining and until comparatively recent years, the supplying of air, *fresh air*, to the men inside has been more or less haphazardly carried on. Today practically all operators realize the great importance of maintaining a fresh air supply, but a vast number of operators are not as yet awake to the great economies which may be effected by improving the methods and practices of supplying this fresh air to the face of their workings. The committee mentioned has made specific recommendations which will, if carried out, bring into effect the economies to be gained by their observance.

In attacking the problem of the efficient ventilation of a mine, whether an old mine being rehabilitated to as great an extent as possible, or to a new acreage about to be worked, the question of ventilation divides itself into two general subjects, the "Ventilator" and the "Ventilated," the fan and the mine, cause and

effect; and it is these two subjects taken as they are named which the writer intends discussing, showing to what extent the same may be not "standardized," but improved.

The earliest method of ventilating a mine was by means of natural draft, obtained either by means of sinking a shaft for the express purpose or by taking advantage of the difference in height between two openings in the mine.

The next step was by means of a furnace, this being recorded as early as 1680. It is significant to note that there



A saving of \$6,480 annually in power bills was effected when this all-steel fan, 5 feet in diameter, was substituted for a wood construction double-inlet Giubal type fan sixteen feet in diameter

are mines in the United States today obtaining their "ventilation" by the use of the furnace, being a small matter of 243 years behind the times.

Supplanting the furnace came the earliest and most crude type of positive ventilation, a simple wooden paddle wheel set over a shaft without housing or casing about the rotor, the inlets of the wheel were enclosed and it was thus the first exhaust fan came into being.

This type of centrifugal fan remained in use until the inventor of the scroll or spiral casing by Giubal, who also gave to science the highly important evase stack. The early types of Giubal fan were of wood, and were extremely inefficient mechanically, as compared with the modern type, but they were hundreds of per cent more effective than the original fan running without a casing and discharging the air from its periphery into the open atmosphere.

IN INTERESTING EVOLUTION

After the introduction of the spiral casing and the evase, stack engineers turned their attention to the develop-

ment of the wheel and the evolution has been extremely interesting. The fan of today is now built entirely of steel. Vast improvements have been made in wheel design, the number of blades have been increased, volumetric ratio, manometric and mechanical efficiency have been increased to such an extent that a modern fan 8 feet in diameter will displace a 20-foot Giubal fan and perform the same duty at 125 per cent greater mechanical efficiency, thus paying for itself in one year through the saving of power.

It is again a significant fact to note that there are many hundreds of these old wooden types of fan still in operation throughout the country. Capell, who invented the first double inlet fan, also has many monuments to his name still in operation, but they are disappearing one by one, as are all others of the old type, to give way to the modern, highly-efficient, fireproof steel fan of the multi-bladed type.

To actually "standardize" the mine fan is entirely impractical. Conditions at each mine are so varied that it is out of the question to attempt it. The end to which the industry should strive as regards the ventilator, therefore, is to obtain the best available modern fan, paying close attention to the efficiencies and durability, inasmuch as the big fan installed today is expected to run for the life of the mine.

As regards the drive for the modern fan, standardization in the extreme sense of the word is again baffled, but improvements can be made insofar as they are made in the driving equipment; an auxiliary drive may be placed where there is but one drive, and so on.

The matter of the fan disposed, let us turn our attention to the ventilating system through which the fan must deliver the air. The first question which must be settled is whether the air shall be blown into or exhausted from the mine. Each system has its advantages and its disadvantages. It is not the writer's intention to enter into any detailed discussion anent this point further than to say that in mines having, or likely to have, gas, the exhaust fan is by far the most popular, whereas, in mines free of gas,

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the blowing fan seems to predominate. Practically all fans of the type designed to deliver the main volume of air to the workings are being made of the reversible type. This is a much discussed question, the advisability of installing reversible fans, but the fact remains that the majority of fans installed in the coal fields today are of this type.

DEMANDS CLOSE ATTENTION

Since the fan runs day and night during the life of the mine, making, in some cases, the cost of its operation equal to all the other machinery combined, it behooves the operator to pay careful attention to the fundamental principles governing the flow of air and so design his air shaft, air courses, overcasts and stoppings as to give the fan every opportunity to deliver as large a volume as possible at the minimum resistance.

The relation borne by the mine resistance as expressed in inches of water to the power bills for driving the ventilating apparatus is generally well understood by the operator and yet, well in the face of this knowledge, we are constantly finding an apparent utter disregard of this important fact.

It is no uncommon thing to find a large mine whose development has not progressed beyond three years, requiring a 2-inch pressure to pass 100,000 cubic feet through it. No better indication could be had that the operator's main object was to get a large tonnage and everything else has gone by the board to that end, and for this neglect of his airways he is bound to pay dearly in the future. If a mine only three years old requires a 2-inch pressure to ventilate it, one can readily see what the pressure requirements would be as its life grows longer, the volume required becomes greater and the air courses are held in the same disregard.

It is the duty of the mine superintendent, foreman and inspector to keep a watchful eye on the mine resistance and in the interest of good ventilation and economy see to it that all airways be as large and kept as clean as possible.

We feel that this disregard for an important fact is due not so much to wilful neglect as to a mistaken idea on the part of the operator as to the apparatus used to ventilate the mine. Briefly, many operators believe it is cheaper to let their air course become clogged and dirty and purchase a new fan when more air is needed. But this is absolutely a misconception of the characteristics of a fan. For, be it known, that no fan—no matter what its size or make—can deliver more air into

that mine at the given pressure than the old one.

The mine resistance or water gauge is a characteristic of the mine and is in no way governed by or has anything to do with the fan whose only duty is to run at the proper speed necessary to produce the pressure and volume as called for by the mine characteristics.

The following table clearly emphasizes the importance of maintaining large airways at all times during the life of the mine.



This clumsy and highly inefficient wooden fan with a diameter of 20 feet, was displaced by a modern fan of the multi-blade type with a diameter of only eight feet and of all-steel construction. The result was an annual saving of \$3,000 in power costs in addition to the other economies effected

Formula—Power Varies as			Perimeter Cube of Area	
Size of Airway	Perimeter	Area	Relative powers making airway 10x10-10 hp.	Cost per H.P. per year at 1½ c. K.W.H.
10x10	40	100	10	\$980
8x8	32	64	30.5	2,989
7x7	28	49	59.5	5,931
6x6	24	36	128.5	12,600
5x5	20	25	320	31,360

It will be noted from above table that if it requires ten H. P. for an airway of one hundred square feet, it will require about six times this amount for an airway one-half this size. The average mine requires about 90 H. P. for its ventilation. Assume the area of the airways as doubled, then about 15 H. P. would be required, effecting the saving of 75 h.p.

The system of splitting the air is not carried out as extensively as it should be. There are many mines today in which the current is carried in one continuous column from the intake to the outlet. This system is not only very difficult and expensive to maintain, but is a dangerous practice. In case of an explosion, the whole mine would be endangered, but if the mine were ventilated in districts the effects of the explosion most likely would be confined to a small part of the workings. The splits should be made as

near the intake and the several branches reunited as near the outlet as possible.

The proper distribution of the air through the workings requires a thorough knowledge of the subject. There are few matters connected with the mining industry that require greater skill and ability than the proper coursing of the air. A very slight oversight in the distribution of the air may make all the difference between good and defective ventilation. This important work should be placed in the hands of experienced men who are backed up by certain amount of scientific knowledge on the subject. They should be conversant with the composition of gases, the laws which govern the flow of fluids and a practical knowledge of the operation of a mine fan is indispensable.

The question of airways and air velocities are practically indivisible, inasmuch as the velocity of the flow of air is entirely dependent upon the size and condition of the airways.

It is sectional area alone which governs the velocity of the flow of air. A certain airway may be clean and free from obstruction, yet their sectional area may be so small as to cause such a high velocity that the consequent increase in frictional resistance causes the fan to generate ahead that is entirely too great for the volume passing and so represents a true loss in power consumption.

High velocities not only cause a useless consumption of power, but other more important results are caused by this unsatisfactory condition. It will be found in mines having high velocities in the airways that unhealthy and dangerous conditions exist at the face of workings. This is due to the fact that the air carries in suspension the dangerous dust particles in greater quantities at high velocity than at a slower velocity, and these are carried back to the live workings. It is also noted that during the winter months, when the intake is on the haulage, a high velocity greatly aggravates working conditions.

From the foregoing it will be seen that standardization in the exact sense of the word is not likely ever to be effected, but standardization, in the broad sense of the term certainly is within the power of every operator in that he can improve to his advantage the methods and practices of mine ventilation, and by following as closely as possible the recommendations of the Committee on Standardization of Mine Ventilation, he can eliminate to a certainty those vexatious troubles that creep upon the operator as his workings become more extended and complicated.

THE FUTURE OF THE STANDARDIZATION MOVEMENT

Success is Dependent Upon Educative Process—When Proper Interest Is Created, Tentative Standards Can Be Adopted—Resulting Discussions Will Provide Basis For Permanent Standards

BY WM. B. DALY*

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FOR MANY YEARS mining operators throughout the country have realized that a large amount of money was being wasted annually by following obsolete mining methods and practices and by the installation of a large assortment of specially designed equipment for mining purposes. This condition has existed from the beginning of the mining industry, but until recently no action in a general way had been taken to correct it.

It is true, however, that several years ago a few progressive mining operators had given considerable thought and study concerning this very important subject, and as a result thereof introduced, wherever possible, more modern and scientific methods and practices, and have eliminated many of the special designs of their operating equipment in their respective properties. This action on their part constituted the first real step in the standardization movement. The results obtained by these pioneers in this work were so satisfactory that a great many more operators followed their example. By so doing a considerable amount of waste was eliminated and the cost of production was correspondingly reduced.

FEDERAL AGENCIES CREATED

The United States Bureau of Standards and the American Engineering Standards Committee then came into being, and, with the assistance of the United States Bureau of Mines, much valuable work was accomplished in the furtherance of the movement. The manufacturers of mining equipment have always advocated the principles of standardization, but they were powerless in the matter for the reason that they were compelled to manufacture the equipment according to the designs and specifications that were furnished them.

Many papers have been written and much discussion has taken place during the past few years in mining meetings and conventions upon this subject, but no organized effort or action in a general way to reach all of the mining operators was taken until about three or four years ago when the American Mining Congress, realizing the urgent necessity of a general movement of this kind, created

*Chairman Committee on Standardization of Underground Transportation, Metal Mining Branch, American Mining Congress.



and established a National Standardization Congress, which meets annually in conjunction with its annual convention.

DIVIDED BETWEEN TWO BRANCHES

The work of the Congress is divided into the Coal and Metal Mining Branches. The Coal Mining Branch is divided into a General Committee and the following subcommittees: Underground Transportation, Mining and Loading equipment, Drainage, Ventilation, Outside Coal Handling Equipment, Underground Power Transmission, Power Equipment, Mine Timber and an Advisory Committee on Safety Codes. The Metal Mining Branch is divided into a General Committee and the following subcommittees: Mine Drainage, Drilling Machines and Drill Steel, Underground Transportation, Fire Fighting Equipment, Steam Shovel Equipment, Mine Ventilation, Mechanical Loading Underground, Mine Timbers, Mine Accounting, Milling and Smelting Practices and Equipment, and Methods of Mine Sampling. The personnel of these committees is published regularly in the Mining Congress Journal. These men represent the largest manufacturing concerns of mining equipment in the country and the largest producing mining companies in the United States and Mexico.

The chairmen of these committees have from time to time during the past three years forwarded questionnaires to the different members of their committees and to other mining operators, requesting information concerning mining methods, practices and equipment, and the answers thereto have shown an almost unlimited variation in every respect. It is true that in a very large

majority of the cases the present conditions have been inherited from preceding managers and that it is not advisable to change the old order of things insofar as they affect the old workings, because the cost of making the change would be far greater than the savings which would result, but in all new work connected with the present properties and in the opening up of new ones definite standards, which will be reasonable, safe, efficient and economical, should be established and followed. We all know that conditions in all mining districts and in mines of the same district are different, but we must admit that there is not enough difference to warrant the great variations which the answers to the questionnaires have shown.

PURPOSE OF MOVEMENT

It is not the purpose or intention of the present movement to agree upon or to decide in favor of a single standard upon any of the many propositions that have been or will be submitted, but it is the purpose and intention to create a sufficient interest among all mining operators of the country through education whereby special features, wherever possible, will be eliminated and whereby as few standards as possible will be agreed upon, adopted and practised to best serve the purposes efficiently and economically. Much good has resulted from the efforts of those operators who have already practised the principles of standardization in their individual properties, but the desired results cannot be obtained in this way. It can only be accomplished by the assistance and co-operation of all operators. If the proper interest and cooperation can be developed and secured to support this movement, it will, in my judgment, be the greatest step that has ever been taken in modern, scientific and economic mine management.

The mining methods and practices of the past and of the present day came into use more as a matter of custom than as a result of a scientific study of the conditions. The old practical mine foreman had his own ideas of just how certain conditions should be met, and as a rule he had his way and put them into operation. Each mine foreman in each mine had different ideas from the other, and, as a result, different methods and practices were put into effect in mines

of the same district, although the conditions were almost identical. Then, again, the foremen of each district thought that their conditions were entirely different from any other district, and still other methods and practices were put into effect. This condition has existed from the beginning of the mining industry and it will require considerable educational work to change these customs and methods.

ATTITUDE OF INDIVIDUAL

The human being of the present day is a victim and a slave to custom. He is perfectly willing to recognize and obey laws which are enacted that have for their purpose the protection of the personal rights and property of others, but when rules, regulations or laws are made which tend to regulate his own personal conduct or business he does not take kindly to them. He feels that he is being deprived of his personal judgment and liberty. The so-called reformers of the present day have caused the enactment of legislation tending to improve the moral, social and physical standing of mankind. The average man knows full well that if these laws are obeyed strictly that a most wonderful improvement in mankind will result, but he knows also that to obey them means that he will have to give up immediately the practices, habits and customs of generations and centuries. In a great many instances, however, he prefers to follow the old and well-established customs rather than to obey the new laws, although, as I have stated, he knows that he and all mankind would be far better off if he would follow the laws.

Why does this condition exist? It exists simply because the reformers did not first educate and enlighten the people as to the benefits that would accrue to mankind by following the new ideas, thoughts and practices as compared with the old. This apathy on the part of the average man toward a change of customs has been the sole cause of the partial failure of most of the so-called reform legislation of modern times. It only goes to prove that any nation, state or any other political subdivision must first educate the people to the new way of thinking, reasoning and acting before legislation is enacted which will eliminate the customs that have been followed for years, generations and centuries. If the people of the United States had been first educated to partake of alcoholic stimulants in a moderate and temperate way, much better results would have been obtained than have by the enactment of the Eighteenth Amendment to the Constitution. The forces favoring prohibition directed their entire time, attention and money in furthering the enactment of this amendment and none whatever to edu-

cation. This amendment, by one stroke, attempted to change the customs of a people which had existed for thousands of years. The proper education had not preceded its enactment, and as a result its successful enforcement is still in doubt.

SAME OBSTACLE ENCOUNTERED

Every new idea, every new thought and every new movement has met, and will meet, the same obstacle. For years this same obstacle confronted the Safety First movement. The average workman of the past was naturally careless. Carelessness to him had become a custom. The average operator of the past paid little attention to safety conditions, tools or appliances. He felt that it was the duty of the workman to look for his own safety. But a new order of things came into being. A few large employers of labor studied and analyzed the many accidents which were occurring at regular intervals under their jurisdiction and the injuries resulting therefrom. They studied the humanitarian side of the question, and they saw what a wonderful thing it would be if a less number of accidents occurred. Then, again, they found that they would save large sums of money if there were fewer accidents and a less number of settlements and suits for personal injuries and deaths.

The success of these pioneers soon became known and other operators did likewise. National and other safety organizations resulted and the Safety First movement was launched. At first this movement did not have the hearty support to which it was entitled. A great many employers of labor did not enthuse about it, because they thought that it would interfere with their operations and would increase the cost of production. They took this position because they did not take time to analyze the subject as they should or the benefits that would accrue therefrom. The average workman did not take kindly to it, because he felt that it interfered with his work and the practices and customs which he had always enjoyed during his lifetime and which he had really inherited from his fellow workmen or his ancestors.

HISTORY OF SAFETY RULES

As the movement grew, safety-first rules were adopted and established, but they were almost invariably violated at first because the proper education of the operator and the workman had not preceded their adoption. After several years of the proper education of the principles of safety first, the operator and the workman have finally realized the importance and benefits of the movement, so that today they cooperate in every way in carrying out reasonable safety rules and regulations. It required

ten or twelve years, however, to bring about this result.

And so it is with the standardization movement. As I stated before, the present methods, practices and equipment of the average mine are the results of customs established from year to year in different mines and districts since the beginning of the mining industry. How can these customs best be changed and the new ideas, thoughts, standard methods, practices and equipment be substituted? Will the adoption of standards by the present supporters and advocates of the movement be sufficient? Or must the average operator be better educated on the subject, whereby the savings and benefits to be derived therefrom will be better understood by him before the adoption of standards?

The future of the standardization movement rests solely on these questions. Every man possesses a certain amount of pride in himself and in his work. He would not be worth much if he did not. Every mine operator possesses a certain amount of pride in his mine, the methods he uses and the results he obtains. Invariably he is ready and willing to show them to other mining men, and if the other mining men compliment him he immediately shows his pleasure. If his methods are attacked, he is ready to fight and defend them. He thinks that his knowledge of his conditions from which he has formed his judgment concerning his methods and practices in use at his mine is just as good, if not better, than anyone else, and in a great many instances he is correct. If he is not correct, it is necessary to show him wherein he is wrong and to teach him a better way.

THE PASSIVE ATTITUDE

The average man will invariably defend himself if he is attacked personally and directly, but if he is attacked in a general way wherein a great many other men are included, he prefers to remain passive. And so it is with the average mine operator. If you attack the methods in his particular mine he will immediately defend his position, but if you attack his methods in a general way by referring to certain methods in certain mines or districts without mentioning his name or his mine, he prefers to remain silent. It is much more difficult to teach and educate a man who remains silent and passive than the man who will argue with you. With the man who will argue and who will openly and freely discuss the situation you know what he is thinking about. If he is wrong you know that you have some chance of converting him to your ideas and thoughts. But with the passive or silent man you never know whether you have sold him the proposition or not.

This situation, I think, is the weakest

thing about the present standardization movement. It is safe to assume that all operators at the present time are not in accord with the movement. There are a great many who contend that it cannot be done, but they will not defend their position. They prefer to remain passive, and they will not assert themselves openly in conferences or by writing papers or articles on the subject. If they did the educational feature of this movement could be better taken care of. There is no better way to educate the average mine operator to the principles and benefits of the standardization movement than to argue and discuss the subject with him.

NECESSITY OF ACTION

I have had the pleasure of visiting nearly every large metal mining district in the country, and I have been seriously impressed with the urgent need of some action of this kind tending to eliminate the many variations in methods, practices and equipment. As chairman of the Subcommittee on Standardization of Underground Transportation, I sent a questionnaire, containing sixty-one questions upon this subject, to twelve of the most prominent mine managers, superintendents and mechanical engineers employed at some of the largest properties in the United States and Mexico. Answers to this questionnaire only confirmed the conclusions formerly reached. I then wrote an article in the March, 1922, issue of the MINING CONGRESS JOURNAL, setting forth the situation as it existed. I invited criticism and discussion, but I only drew two replies and they were not criticisms. The reason that I did not receive more replies was that I attacked their methods only in a general way, and not directly.

If proper discussion or adverse criticism of the subject could be secured it would not be difficult to arrive at some standard or standards which would meet with the approval and cooperation of a very large majority of mining operators. So far, all of the papers which have been written have been unqualifiedly in favor of the movement. The operators who oppose, or who think it cannot be done, have not yet been heard from.

I do not wish the reader to understand that I am in doubt about the final outcome of the movement, because I am not. I am simply endeavoring to analyze the situation to determine what is necessary to be done in order that it may be put over successfully within a reasonable time and at the same time have as nearly as possible the united support and cooperation of all of the mining operators. The adoption of a set of standards by the Standardization Division of the American Mining Congress will be valueless unless they are properly, willingly and conscientiously supported by a very

large majority of the mining operators and manufacturers and just as conscientiously applied.

The movement initiated by the American Mining Congress is only three or four years old. Much valuable work has already been accomplished, but there is still a vast amount of educational work to be done. The proposition has been very successfully sold to all of the officers of the Congress, to all of the members of the different subcommittees and to the very large number of members of the Congress who have attended the Standardization Conferences, but what about the large number of members of the Congress who have not had the pleasure of so attending, the large number of members of other mining organizations and the large number of other mining operators who do not belong to any of the large mining organizations? Are they being properly reached in an educational way? I think not. The Standardization Bulletin is sent once each year to each member of the Congress. This Bulletin contains much valuable information and discussions on the subject, but it does not drive the question home to them often enough.

The MINING CONGRESS JOURNAL is published and distributed monthly to all members of the Congress, but it does not contain enough papers from mining operators covering this important subject. If the silent or passive mining operators will not come to us, we should go to them. Every member of every subcommittee should write papers on standardization work covering the features under his observation. These papers should contain more than general discussions of the main movement. They should go into detail and, by comparison, should show the right and the wrong way of doing things. In my judgment, this is the kind of educational work that should go on for some time before we attempt to adopt standards. You can educate and convince a man who is not doing his work properly much quicker by drawing comparisons of his work with more improved methods than in any other way.

I appeal to the supporters of this movement not to rush to conclusions too quickly. The papers that have been written and the discussions which have been had have as yet only been participated in by a minority of the mining operators of the country. The conclusions of this minority at this time may not meet with the approval of the majority. Enlighten and educate the majority first, and when they see the light they will probably be your best supporters. The judgment of the majority may be just as good, and it may be better, than the minority. When you have them with you, then discuss, argue, agree upon and adopt your standards. And

even then the first standards should be only tentative.

When the proper interest through education of a large majority of the mining operators in standardization has been secured, then is the time to adopt the tentative standards. The application of these standards will most certainly bring out arguments and discussions concerning their correctness. Honest, frank arguments and discussions will establish the merits and faults of each and every tentative standard. By this process permanent standards which will be satisfactory and which will meet with the approval of a majority of the mining operators and manufacturers will eventually be agreed to and adopted.

In my judgment, unless the procedure outlined herein, or something similar, is followed, the successful future of the standardization movement will be in doubt for some time to come, because it is one thing to make standards and another to get operators and manufacturers to follow them. And unless they are followed there is no real value in establishing them.

PLANS TO DEVELOP SUTRO TUNNEL

DEVELOPMENT of the celebrated Sutro tunnel, built for the purpose of penetrating and draining the famous Comstock lode in Nevada, from which over \$325,000,000 in gold and silver was mined in the early sixties, is in prospect.

This information was made public by the Department of the Interior recently after negotiations with New York interests now controlling the tunnel under a grant made by Congress to A. Sutro, his heirs and assigns.

Construction of the tunnel was started in 1866 and continued for some four miles into the mountain later by New York interests, but precious metals were not found in such great quantities. Sufficient revenues were derived, however, to keep the tunnel in operation, although no steps have been taken since to extend it. The Department of the Interior recently notified the interests that unless steps were taken to complete the tunnel, the grant of mineral rights for the unbuilt portion would have to be waived.

The New York interests presented data to the Department this week to the effect that a revival of mining and milling of ores is going on in land tributary to the tunnel, promising substantial revenue, and, therefore, announced their intention of beginning construction upon the extension of the tunnel within the next eighteen months. Upon their failure, they agreed to quitclaim their interests granted by Congress to the United States after that time. The Department of the Interior assented.

HOW THE "HOOVER PROCESS" REDUCES MINING COSTS

Simplified Practice is as Vital to Profitable Mineral Recovery as Mechanical and Chemical Processes That Have Brought Operations Up To Present Standard

BY RAY M. HUDSON

Division of Simplified Practice, Department of Commerce

FROM THE Forty-niner's "pan" to the modern concentrator, the dominant note in the evolution of mineral recovery processes, methods and equipment has been higher yield at lower cost.

When Plattner originated his chlorination process in 1848, the greater return per ton of ore drew wide attention. Gold producers quickly adopted the process, with very satisfactory results. Then along came MacArthur and Forrest with their cyanide process, patented in 1890, and again the relative recovery increased. Another forward step occurred in the electrolytic separation of gold from cyanide solutions. Today the process that promises even closer approach to 100 percent recovery is the "Hoover Process of Simplified Practice."

ELIMINATES WASTE

The surprising thing about the "Hoover Process" is its wide range of application! Not only is it adaptable to the gold-producing industry, but we guarantee its application will yield more "gold" in any industry. Simplified practice is based on the necessity for eliminating economic waste—waste of materials, energy and time.

"We have probably the highest ingenuity and efficiency in the operation of our industries of any nation. Yet our industrial machine is far from perfect. The wastes of unemployment during depressions; from speculation and overproduction in booms; from labor turnover; from labor conflicts; from intermittent failure of transportation of supplies of fuel and power; from excessive seasonal operation; from lack of standardization; from losses in our processes and materials—all combine to represent

a huge deduction from the goods and services we might all enjoy if we could do a better job

of it." So speaks a mining engineer—one Herbert Hoover.

The Committee on Elimination of Waste in Industry recommended that a nationwide program of industrial standardization be encouraged by the government in cooperation with industry, for in the standardization of design of product, methods of procedure and number of models there rests a large opportunity for the reduction of waste. Among the first official acts of this mining engineer when he became Secretary of Commerce was the establishment of the Division of Simplified Practices. This division serves as a centralizing agency in bringing producers, distributors and users together, and then acts to support the recommendations of these interests when they shall mutually agree upon simplifications of benefit to all concerned.

COVERS WIDE RANGE

Simplification, the primary process of standardization, means that policy of business management which endeavors within each particular enterprise to dispense with as many parts, types, varieties of product and sizes thereof; also as many price ranges; and as many processes and methods as can be eliminated PROFITABLY. It can be applied in a single plant, or by cooperative action, to an entire industry.

Not only does simplification yield larger returns to manufacturers, jobbers and dealers, but it means some real savings to consumers. With the metal-mining industry spending \$65,000,000 and the coal-mining industry

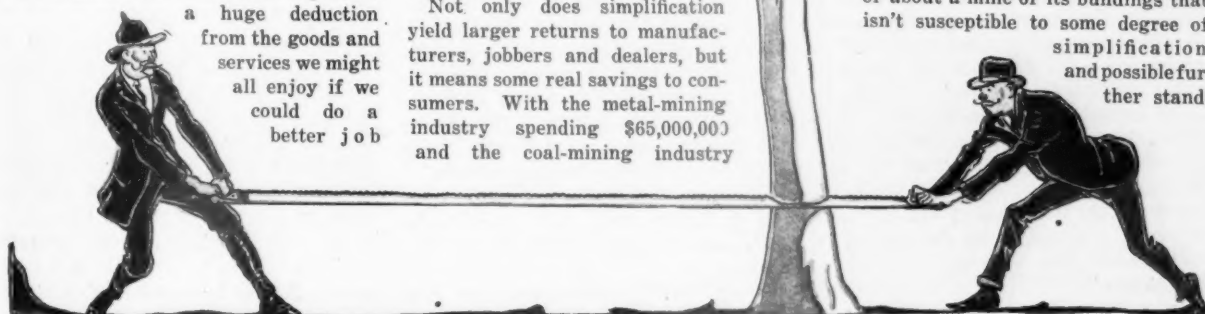
spending \$145,000,000 annually (according to the 1919 census reports) for supplies and materials, the combined purchasing power suggests these great consumers will find they can save money by urging simplification of many items used in construction, operation and maintenance of their properties.

For example, take shovels. There are more varieties in shovels than Heinz has pickles.

Every manufacturer has his own ideas about the best shovel on the market, and not among the least of these ideas is the one that in order to get the business, his shovel must be different in shape, form, size, style, pattern, finish, etc., from anything produced by his competitors. But the wily salesman for the competing house, as he notes the satisfied smile on the face of the fellow that landed the order for the "X" Shovel Company's "No. 2's" pens a long letter to his manager, saying if the "Y" company would only bring out a shovel like that of its competitor, then he, the "Y" salesman, would send in more orders. "That's so," says the sales manager; so one more model is added to the "Y" line. Then the "Z" company, also the "A," "B" and "C" outfits, follow suit. Thus is the Ossa of Variety piled upon the Pelion of Production Cost. Imitation may be the sincerest flattery, but flattery, especially of this kind, usually costs the "flatterer" more than it does the flatterer. And out on the end of the line, like boys playing crack the whip, the ultimate consumer pays for it all.

PLAYED IN EVERY LINE

This same little comedy is being played in every line of production. There is scarcely an article used in or about a mine or its buildings that isn't susceptible to some degree of simplification, and possible further stand-



ardization. Light steel rails in nine or more weights per square yard; wire rope in goodness knows how many sizes; rock drills in greater variety than economical mining warrants; pipes of numerous diameters, thicknesses and threads—valves galore that can't be interchanged—small tools, packings and a hundred other things that make the average storeroom look like one of Woolworth's chain. The simile breaks down there, however, for Woolworth makes his money by quick turnover of his stock, whereas the mine can lose two days—through excessive consumption of supplies and by the interest on the huge investment forced on it because of the infinite variety of non-standardized items carried as a factor of operation safety. The mine-car manufacturers might form a "Miniature Master Car Builders' Association," and thereby develop some standard running gears that would bring blessings on their heads from mine superintendents. Variety may be the spice of life, but most kinds of spice are expensive.

Here and there you'll find a manufacturer that believes that "quantity creates income and variety creates expense." A certain wheelbarrow manufacturer formerly produced 165 different types of wheelbarrows. Now they make only 30 styles and believe this can be cut to 10. Where 24 different frames were required, they now use one kind of frame, and one kind of lumber. The 26 trays have been reduced to six, and all the holes are punched the same. Thirteen wheels have been standardized in one. As a result, their woodworking department which formerly employed 15 men turning out 330 pairs of handles a day now employs 12 men producing 600 pairs daily. The mining company that buys those barrows gets relatively better quality at lower price.

WHAT IT WILL DO

Simplified practice will decrease stocks, production cost, selling expenses, misunderstandings and all costs to the user, including initial, accessory and maintenance costs. Simultaneously simplified practice will increase stock turnover, stability of employment, promptness of delivery, quality of product, also profit to producer, distributor and user. Quoting Secretary Hoover again, "It is certain there are a great many articles of everyday use in which the manufacturer would indeed be glad to undertake some cooperation in simplification, from which the saving in national effort would be interpreted not into millions but into billions of dollars. This does not mean we stamp the individuality out of manufacture, or invention or decoration; it means basic sizes to common and everyday things."

In its larger aspect, simplification is

essentially a conservation measure, for it avoids the unnecessary use of basic materials and reduces the waste of materials in manufacturing processes. It encourages the utmost use of existing facilities, and thereby prevents unnecessary plant expansion. Labor formerly occupied in the production of varieties for which there is no economic need is made available for essential work. The War Industries Board record shows many examples of the conserving power and influence of simplification.

The American Mining Congress has in its Standardization Division the necessary machinery for initiating action leading to the simplification of mining materials and supplies. A comprehensive review of current stocks in a few of the larger storehouses would show many items carried under a common name, but differing in many details. The

obvious thing to do will be to eliminate the superfluous and unnecessary variants as an aid to more efficient stores-keeping. Such action simplifies purchasing, delivery and replacement. Idleness or "stand-by" charges resulting from slow delivery of non-standard parts or supplies are also lessened. Suggestions to the Division of Simplified Practice regarding the desirability of less variation in these articles will be taken up with manufacturers and jobbers with the view to cooperative action in "simplifying the line."

This method of government cooperation with industry is yielding some very profitable returns to other industries. The question is, "Will the mining industry apply this Hoover process of increasing the returns from its present expenditures for material and human energy?"

CONSULAR REPORTS SHOW SILVER STATUS

Documents Coming to Department of Commerce From Foreign Representatives Indicate Present Position of White Metal's Demand in China and India.

WITH THE Senate's silver investigation committee soon to convene in its initial sessions for the launching of a thorough research into world-wide conditions affecting the production, marketing and demand for the white metal, as well as similar economic phases affecting gold, much interest is being attached to reports which are coming into Washington as a result of information requested of the Treasury and Commerce Departments by various senators interested in conditions which will arrive when the Pittman act expires.

Since India and China long have been "sink holes" for silver, and because the trend of Oriental trade balances so vitally affects demand for the metal, current consular reports from these countries hold extraordinarily important information.

Foreign banks in Shanghai report an acute shortage of silver, owing to large loans of silver made to the Chinese prior to the Chinese New Year, says Trade Commissioner L. W. Hoyt in a cable to the Department of Commerce.

Shanghai bank stocks of silver are estimated at \$67,000,000 Mexican, as compared with \$78,000,000 a year ago, and \$60,000,000 last month. The New York bank buying rate for the Shanghai tael on March 15 was \$0.75.77; and for the Mexican dollar, \$0.54.73. Exchange rates are adversely affecting exports.

Labor conditions have improved except at Canton where political conditions have caused considerable unrest but commerce does not appear to be seriously affected. Strikes and unrest have generally been decreasing.

Silver stocks in India are also low and there is a strong demand for the metal in the interior. The effects are now being felt of the contraction of the currency which the government has been carrying out since last August.

India's foreign merchandise trade continues to be promising and indicates general future prosperity, according to a cable to the Department of Commerce from Consul Harold Shantz, Calcutta. A favorable trade balance, established February, 1922, and maintained during each of the following months except October, 1922, was continued for January, 1923, and amounted that month to 67,300,000 rupees, in contrast with an unfavorable balance of 46,300,000 rupees for January, 1922.

General business conditions change slowly in India, but the general tendency is toward a quiet market with relatively little demand for any goods in warehouses. A leading British authority on Indian affairs feels that the commercial crisis is entirely passed. Returns show that the foreign market for all Indian products is increasing.

The money market is reported as temporarily easier, though it is generally seasonally tight in Calcutta during the moving of the crops from November to March. The Imperial Bank rate remains unchanged, and there is much discussion being aroused over the fact that the Bank of England rate is 3 percent, in contrast with India's rate of 8 percent. Short loans are being made, and rates remain firm at 5 percent on demand and 5½ to 6 percent for one to three months.

IS STANDARDIZATION POSSIBLE ?

Country Now is Reaping Vast Benefits as Result of Standardized Industrial Operations That Once Were Considered Impossible—Survey Shows Host of Opportunities for Further Improvement

By C. H. MATHEWS*

Engineer, Hudson Coal Company, Scranton, Pa.

WHEN A NATION is confronted with the problem of a sudden enormous demand upon its resources, we begin to realize how inadequately our plans have been laid to quickly respond to such emergencies.

A nation's wealth is largely made up of its industries, so, if the various industries do not keep their houses in the best of order, the whole nation suffers.

Our natural resources being great, we may be a bit careless at times and unintentionally fall into wasteful methods in order to meet unusual production demands.

THE PRACTICE OF CONSERVATION

We believe that every consideration for conservation and economy is practiced in our usual operations, but, as an actual fact, is this true?

We build super power plants at great cost that will generate a kilowatt hour by the burning of less than two pounds of coal, and, at the same time, we have plants in operation at our mines, where our coal is produced, that require as much as ten pounds of coal to generate a kilowatt hour.

Our coal supply, while enormous, is not inexhaustible; therefore, would it not be better to burn the necessary amount of coal under the boilers of the large power plant and operate the mines on purchased electrical energy instead of burning many times the required quantity by the use of small isolated plants?

Many isolated small plants would continue in operation if it were always possible to obtain suitable water for boiler use. The water problem has undoubtedly done a great deal more to encourage mine operators to use central station power than the question of conservation of fuel, as the fuel consumed at the mine, or source of supply, is generally considered to have a negligible value.

Where a group of mines can be electrically operated from a central generating station there may be some argument in favor of a privately-owned plant, but the water problem for boilers and condensing purposes again has to be considered with the result that the plant would, in the majority of cases, have to be located some distance from the mines.

We have frequently gone into the question of fuel and ash-handling, labor and

other expenses at small plants, the transportation of fuel to remote central stations and various other items entering into the cost of power and have become convinced that the most economical method is to generate electrical energy in central generating stations.

The economy of a moderate-sized generating station does not compare favorably with the super power plant, so that,



C. H. MATHEWS

as a matter of conservation of fuel, very little, if anything, has been gained by the operation of privately-owned plants; furthermore, the average mine owner is more interested in producing coal than he is in the generation of electrical power. It would, therefore, seem that the Power Company could generate and transmit electric current at a lower cost than could possibly be produced by the mine operator. Modern power plants must be located where there is ample water, and, at the same time, be within a reasonable distance from the source of fuel supply.

If central stations could be located in the coal regions, some saving would be effected in the transportation of coal and the electric power transmission losses to the mines would be low.

The mine operator could then deliver some of his product direct to the central

station and in return secure reliable and cheap power for his mine operations.

Our fuel resources may now be great, but, if we continue to produce coal in a wasteful manner and burn it uneconomically, our supply will get lower and the price higher, until, finally, we will have no reserves to tap for emergencies and the cost of power will be prohibitive. At the present time, we are confronted with an increase in power rates, caused by the increased cost of mining coal and the transportation of this coal to the place of consumption. Railroad transportation in this country is of vital concern to all, and, when we know that over 25 per cent of the coal produced is used by our railroads, we should consider transportation and power as kindred problems.

Owing to the prevailing high prices of coal, it is imperative that the consumer give every consideration to the conservation and economical use of this necessary and useful commodity. Is it not just as important that the producer of coal give the same thought to the subject and endeavor to eliminate all unnecessary expense in order to reduce the cost to the consumer?

Standardization of equipment and mining methods has been proposed as a help in reducing the cost of mining coal, and it would seem that this subject deserves careful consideration by all concerned.

We do not want to try to reduce the operation of mines to one set standard, as this would frequently confine our efforts to possible undesirable methods and the use of obsolete machinery. We can, however, establish standard methods of applying the most improved and efficient equipment available and discard obsolete machinery, which is a source of unnecessary expense.

How often we continue the operation of old equipment, thinking the investment in new is not warranted, but we could often afford to change if the power costs are considered.

MANY OTHER EXAMPLES

We still have miles of steam lines radiating from the mine boiler plants, but we are glad to see such wasteful methods being gradually eliminated and the more flexible and efficient electrical power substituted. Eventually, all mines will be entirely electrified, and we will then have adopted electrical energy as a standard for all power requirements.

We have adopted several standard volt-

*Chairman, Committee on Mine Drainage, Coal Mining Branch, Standardization Division, American Mining Congress.

ages for transmitting and distributing electric power, but we would not want to confine ourselves to one voltage on account of evident economic reasons.

Not many years ago we had an endless variety of insulators in use on electric power transmission lines. Each operating engineer had a different opinion as to the proper design of an insulator for a given voltage, and the manufacturer, probably through inexperience, usually followed these recommendations. The experience gained by the use of these various types resulted in our present efficient units. While no two manufacturers furnish identical products, all modern insulators of one voltage fit standard pins and perform in a similar manner.

We, therefore, now, after years of research, reap the benefits of standardization which at one time was considered impossible.

It has taken many years and much hard work to bring about changes of this character, but we hope that changes in the future will produce even greater benefits than we have already derived.

One problem which we might term an obstacle to the standardization of mining equipment is an unusual condition characteristic of the mining industry. All mining men plan their developments months, or even years, in advance, but usually neglect to order the necessary machinery until it is actually needed. Quick shipments of equipment and material are then requested of the manufacturer, with the result that in many cases unsuitable machinery is improperly applied and a more or less temporary installation is made. If the manufacturer can have sufficient time in which to build and deliver his product, a more efficient piece of apparatus, built for the job, can be secured, a better installation is made at a lower cost, and more satisfactory operation is obtained.

On the other hand, if the manufacturer could standardize on his equipment, there would be less delay in making shipments. Some manufacturing companies endeavor to keep in stock standard electrical equipment, such as motor-generators, synchronous converters and switchboards, but the job is usually delayed by some slight change or is held up waiting for buildings and miscellaneous supplies.

LOCALIZED MINING PROBLEMS

We have another phase to consider, namely, the operator who feels that it is impossible to standardize owing to the variable conditions encountered at each mine. We heartily agree and deplore this fact, but is it such a serious matter that we cannot overcome it, at least to some extent? Standardization does not mean that every installation must be identical; this would be too much to expect; but it does mean that each installa-

tion, or rather each piece of equipment and its application, should be according to some definite economical standard. Many operators standardize to the extent of purchasing all equipment from one manufacturer, even if another design may be better adapted to the work.

Mine locomotives are fairly well standardized, but improvements are continually being made, and it would be folly to continue to purchase obsolete machines only for the purpose of duplication. A recent improvement of control on mine locomotives is the application of dynamic breaking, resulting in a saving on brake shoes and wheel repairs. This saving in operating cost might pay for the installation of this type of control on the older locomotives, especially those used for gathering purposes.

Obsolete machines cost more to keep in operation than the improved types, so the discarding of the old non-commutating pole, sleeve type bearing motors for the commutating pole, ball-bearing types would be a step towards economy.

Mine locomotives, as now built by the various reputable manufacturers, are more or less standardized. They have approximately the same size motors for a given weight, certain minor details are similar, and all follow the same general construction. If several builders of this kind of mining equipment can standardize, why is it not possible to assist them further and at the same time help ourselves by standardizing on one or possibly two track gauges. We find that the track gauges used are between thirty-six and forty-eight inches, with the result that locomotives must be built to order, mostly on account of the track gauge, but partly on account of the various designs of bumpers specified. The majority of coal mines have standardized on a track gauge of forty-two inches. If this gauge could be adopted for all coal mines, the locomotive and car builders would then be able to supply their customers with a more standardized product, and the mine operator would be able to transfer haulage equipment to any mine without change.

IT HAS BEEN DONE

It would require some time to get all track gauges down to such a definite standard, but it is no greater problem than that which confronted our railroads when adopting their standard gauge. It is not an expensive job to change the gauge a few inches on any of the usual designs of mine locomotives. Cars are continually being overhauled and replaced by new, so the question of changing the gauge on mine cars is not a serious matter.

One of the greatest losses in mine operation is on power for locomotives and coal cutting machines, as very few mines have sufficient feeder cables for

economical operation and rail bonds are seldom kept in the best of condition. Reduced voltage at the cutting machines lowers the speed and incidentally the output per machine. Low voltage causes armatures to burn out, which not only increases repair costs but lays the whole machine up while a new armature is being installed. Loss in voltage not only hinders coal production but every volt drop in the trolley wires, feeder cables and tracks is power consumed without doing useful work, so it is imperative that a suitable feeder system be installed and properly maintained.

Many of us remember the old Cornish Pump, a slow-moving, cumbersome piece of machinery requiring a large sum of money to install and a continuous expenditure to keep it in operation. Since the development of lighter, cheaper and more efficient pumping equipment we would not now even consider the use of the monstrosity which was once the pride of our "Cousin Jacks." The old-time pumpman who was accustomed to steam-driven units of mammoth proportions looked askance at our present-day centrifugal pumps. A story has been told where one of the old pump runners reported the receipt of a priming pump, but advised that the main unit had not yet arrived.

Since the advent of modern pumping equipment we have followed along similar lines in the various designs, and have centered our interest upon possible improvements to apply these designs to mine service. Having thus interested ourselves in mine pumps, we have made a start and have standardized to some extent upon certain features of design which we have found to be the best. We select our requirements from a variety of makes and designs, but only a limited number have really proven suitable for mine use. It is therefore desirable that some sort of standardization on pumping equipment be adopted in order to eliminate that which has proven unreliable.

MINE DRAINAGE PROBLEMS

Sometimes a little study of our drainage problems will allow us to take advantage of natural drainage by means of tunnels or ditches. The first cost of special tunnels for drainage might often prove more economical than the installation and upkeep of a pumping plant. The average mine operator has become so accustomed to thinking of mine drainage in terms of pumps that all other matters are side issues, not usually thought of or at most forgotten. It is a good thing to get something firmly established in our minds, but we often lose sight of benefits that might be derived from some other application or method. If we will try to consider the several means of accomplishing the one object in view we will soon see that a

former adopted standard cannot always be economically applied, especially since various methods become obsolete within a short period of time.

In applying small gathering pumps where the head and capacity requirements do not vary over a wide range, it is perfectly feasible to arrive at some sort of standardization. One or possibly two sizes could probably be applied at any one mine or group of mines. The capacity can be varied over any reasonable range up to the maximum of the pump selected by simply changing the gears, or possibly the speed of the driving motor. It might even be economically possible to use the same motor and control on all installations where the pump could be applied and the only change would then be in the gears. This method of standardization has been adopted at many mines and can be to others if a careful survey is made of the requirements and sufficient time is given the manufacturer to deliver the equipment needed.

If a thorough study is made of all pumping requirements at each mine it is even possible to standardize on centrifugal pumps for the main stations. This does not necessarily mean to have duplicate units for all stations, but it does mean that all pumps of one capacity and make can have duplicate parts. All impellers and vital wearing parts of one capacity can be interchangeable with other pumps of like capacity. The only change being in the number of stages to accommodate the different heads.

MEANS OF GREAT SAVING

A great saving can be made in the application of mine pumps if we will at first investigate the water conditions encountered. Many incorrectly designed pumps are installed due to lack of information or neglect on the part of the local management on the question of mine waters.

We often see pumps brought out of the mine for repairs where the pump shows unmistakable damage entirely due to the corrosive action of mine water. These pumps are repaired and returned to the mine for another few weeks of service. Properly designed and constructed pumps for handling acid waters can be secured and will last a long time if care is taken in their operation. By making a thorough analysis of mine waters we can easily determine the type of pump construction needed, so why is it not possible to standardize on our pumping problems, especially since we know that practically all mine waters contain varying amounts of sulphur? The practice of purchasing and installing the ordinary trade type of pump can be eliminated if all pump builders can realize the conditions that have to be met

in mining service. In order to protect the mining industry it is necessary and possible to standardize on the proper design and construction of pumping machinery and purchase only that which meets the standards adopted.

The action of a mine fan and its exact relation to the air course is seldom understood as thoroughly as would be expected by men accustomed to this class of work. Adequate area and splitting of airways, properly constructed turns in the air course and similar details cannot be determined except after careful study by men thoroughly experienced in both the theoretical and practical phases of the art. How often we see mine-fan problems determined by the rule of thumb method, or by comparison with another installation. The proper ventilation of a mine is one of the most important and probably one of the most neglected phases of the mining industry. Mine ventilation may be a problem on which it would appear impossible to standardize, owing to the varied conditions encountered, so that very few fans can be duplicated, but similar standard methods can be followed in the application and construction of all installations.

Obsolete fans should be scrapped or used only for temporary installations and emergency. Old fans are frequently housed in wooden buildings and are a great fire risk, besides the power consumed is far in excess of that required by modern designs. Some standardized method can be applied to the selection of mine fans and the air courses can be constructed according to approved designs, so in this manner we gain more than would be possible by duplication, as the life and health of the men is of paramount importance.

Various other subjects could be discussed and numerous details enlarged upon in an endeavor to show that standardization can be successfully applied to the mining industry. It is hoped that this short discussion will gain the assistance of many not now interested in the subject, and that with the help of all standardization can become a reality.

One of the few redeeming features of the Genus Homo is that no two human beings, or, we might say, no two groups of people have the same viewpoint. If everyone agreed we would either have long since fallen into decay or we would now be at our zenith with nothing to do.

INCREASED LEASING WORK BRINGS CHANGES

Bureau of Mines Personnel is Shifted to Accommodate Growing Volume of Public Domain Administrative Activities—New Positions Created

CONTINUED GROWTH of the Bureau of Mines, especially in the supervision of leasing operations on public lands, has resulted in the creation of a leasing branch within the bureau, the appointment of another assistant director and several changes of personnel within the organization.

A. W. Ambrose, assistant director, who is specially qualified in petroleum matters, has been placed in charge of the newly created leasing branch. He also will act as a consulting engineer to all branches of the bureau on matters relating to petroleum and natural gas.

D. A. Lyon, chief metallurgist and supervisor of stations, has been appointed assistant director in charge of the research branch, which includes the functions and scope of the former investigations branch after the elimination of leasing matters. For the present, no appointment will be made to the position of supervisor of stations and Mr. Lyon will perform the duties of supervisor in addition to those of head of the research branch.

T. T. Read, having asked to be relieved from his position as chief of the information service and assigned to investigative work, has been appointed a supervising mining engineer. During the

absence of F. J. Bailey, assistant to the director, on a visit to the mine safety cars and stations, Mr. Reed will serve as the acting head of the operations branch and later on field duty.

C. E. Julihn has been recalled from service as chief mining engineer of the War Minerals Relief Commission and made chief of the information service. Francis Winslow, now connected with the division of war minerals supply, has been assigned to serve with the War Minerals Relief Commission as its chief engineer. J. W. Furness, who has been working with the war minerals supply division of the Bureau of Mines, has been given a permanent appointment in that division.

STANDARD SPECIFICATIONS FOR DRY CELLS

MORE THAN a hundred million dry cells are used in the United States each year, and up to the present time there has been a wide variety in the kinds and sizes manufactured. With a view of eliminating the unimportant sizes for which there was relatively little demand, the Bureau of Standards called a conference of manufacturers and of the largest individual users of dry cells to consider standardization of sizes and of performance.

THE VALUE OF STANDARDIZATION IN MINING

Succession of Flexible Standards Will Bring Progress Marked by Increasing Gains of Efficiency and Economy—Application in Metal Mines Reduces Labor Costs—Plentiful Proof That Standardization Does Not Entail Stagnation

BY LUCIEN EATON*

The Cleveland-Cliffs Iron Co., Ishpeming, Mich.

BEFORE STARTING a discussion of the value of standardization to the mining industry it is essential that the meaning of the word "standardization" be thoroughly understood. Webster gives as the definition of "standard," "that which is established as a model or example by authority, custom or general consent," and as the definition of "to standardize," "to reduce to or compare with a standard." Some standards are fixed and stationary, and there are some that are changed as conditions change and improvements are made. For example, standards of time are fixed, but standards of watch-construction are changeable. In the same way certain standards closely related to mining are fixed by law or custom, and other standards of practice or equipment change from year to year as progress is made.



Lucien Eaton

AN UNJUSTIFIED POSITION

The opponents of the Standardization movement take the position that to adopt a standard is to become stationary, and that those who stand still fall behind in the march of progress. In other words, they believe that standardization means stagnation. They think only of fixed standards, such as those of monetary value and of weights and measures, which in the scheme of civilization must be kept fixed and unchanged, unless endless confusion and loss are to result, and forget the standards of writing, spelling and pronunciation, which are no less important than the others just mentioned, but are not fixed, and are constantly changing, as the last twenty years have most forcibly shown.

The aim of the standardization movement is to eliminate the useless waste of slight variations in design and construction and in organization and opera-

tion, and to select as a standard the best equipment, or the best organization or the best method of operation as developed up to that time, and with the least possible variation, adapt it to the special conditions which exist. When better equipment is produced or better methods of using it have been devised, the standard is changed, and a new one adopted. If we really look into the matter, we see that the best practice of today in nearly every line of human endeavor is based on some sort of standardization, either fixed or temporary, of equipment or method, and even of ideas.

In our own homes we have long established certain standard hours of rising, eating and sleeping, even standard amounts of food, and standard methods of preparing it. If a certain recipe for making especially good bread has been discovered, it is adopted as a standard and the cook is not allowed to vary it as her whim dictates, but it is maintained as the standard formula for making bread, until a better one is found. The success of the Federal Bakeries is based on this simple principle. The examples of changing standards are almost endless, and the value of these standards, even though their life may be short, is tremendous. Look at our changing standards in road-construction, in railroad building, and in excavating machinery. Twenty-five years ago water-bound macadam roads were standard for all except the heaviest traffic, and now concrete or tar penetration macadam are the only types considered. Twenty-five years ago 60 lb. rail was considered heavy enough for all ordinary railroad traffic, and today 120 lb. rail is common, and one of our greatest railroads is considering 250 lb. rail as its standard.

It is the same in excavating machinery. Twenty-five years ago a 60-ton railroad type shovel served by 4-yard narrow-gauge cars and dinkey locomotives was standard practice, and today we have 300 ton revolving shovels loading 30-yard, air-dumped cars which are hauled by 8-wheel standard locomotives. If standards are not adopted, it is easy to slip back into poor ways of doing work and to allow expensive variations of practice to creep in. By standardization, however, each advance is retained, and the loss occasioned by repetition of failures is avoided.

The advantages of standardization for the large mining companies have long

been recognized by their officials, and are easy to appreciate; but it is hard to get the operator of the small property to see them. Yet the advantage to the small operator is nearly as great as to the large one. Take the case of a small coal-mine with a life of five or six years. If cars, locomotives, tracks, etc., are standard for the district or for the field, the original equipment can probably be purchased from some other mine that has recently stopped work, or can be obtained from stock from the manufacturers at a much lower price than special material. Likewise, when the mine is finished, a much better price can be obtained for the equipment, if it is of such size and design that it can be used in other mines in the vicinity. Moreover, during the life of the mine the supply of repairs to be carried on hand can be reduced to a very low figure, and the amount of the investment kept at a minimum.

The value of standardization to the mining industry is hard to determine exactly in dollars and cents, but some approximation of its value in certain cases can be calculated, as I shall explain later by citing a few examples.

The disadvantages of a lack of standardization can be easily shown, however.

AN OUTSTANDING EXAMPLE

A discussion of this subject always brings to mind an example of complete lack of standardization. It was a mine employing about 150 men, and had been operated successfully for a great many years, but there came a time when the cost of production caught up with and passed the selling price of the product, and the mine was closed. Much money had been spent on new equipment, and most of the machinery on hand was modern and in fairly good condition; but there was a sad lack of standardization. Electric power was obtained from two sources, but the voltage on the two lines was different, and one was 60 cycle three phase current and the other 25 cycle two phase current. The motors were of all makes and all sizes, of different voltage and different windings—even the two electric locomotives were of different makes and different sizes—so that thousands of dollars were tied up in repairs, and there were six electricians on the job. There were three air compressors, all of different size and different make, and two of them were driven by electricity and one by steam.

There was only one hoist, but that had

*Chairman, Committee on Underground Loading Machinery, Metal Branch, Standardization Division, American Mining Congress.

two motors, one a spare, which were of different makes and rated at different speeds, and had separate and different controls. In the mine there were twelve or fifteen rock-drills, all used for similar purposes, but they were of three different makes and in four different sizes, and three different sizes of steel were used. The three principal stopes were on two levels, and each stope had its own size of car and gauge of track. Further details could be given, but might disclose the identity of the property. It is closed now, and it might have been a profitable enterprise today if its equipment and methods of operation had been properly standardized so that the employees could have been producing ore instead of taking care of machinery. This example shows clearly that, although standardization will not remove all the difficulties of mine-operation, a lack of standardization increases them tremendously. As a parallel it might be said that, although good health may not necessarily produce happiness, yet ill-health is sure to produce unhappiness.

ON THE OTHER SIDE

On the other side of the picture we have a large and very rich mine which fell into hard ways and small profits through carrying its standardization too far. It adopted certain fixed standards of equipment and methods of operation, and refused to change them. It stood still, and the world went ahead and passed it. It adopted one make and type of drill, and made its own repair-parts. Whenever any part broke, it was made a little heavier next time. Eventually, nothing broke, and repairs were at a minimum, but the drill was so heavy that very little work could be done with it. It was the same with the cars. They were made so strong that they lasted indefinitely, but it took three or more men to push them. And the methods of working underground remained the same as they had been for forty years. Eventually, new management took charge, scrapped hundreds of thousands of dollars' worth of machinery, made time-studies and experiments, and brought the mining practice and equipment up to such a degree of perfection that the mine stands at the front today. Standardization is maintained, but there is no hesitation about changing the standard, if the change can be shown to be sufficiently advantageous.

One of the examples illustrating the value of standardization in the mining industry is that of a large mining company which uses over a thousand rock-drills. After exhaustive tests, one make and type of drill has been adopted as standard, and this company has made the statement that it cannot afford to change to another type of drill unless the increase in drilling-speed amounts to at least 25 per cent. In this case, 1,000 drills

cost upwards of \$300,000, and the value that the company sets upon standardization must, therefore, be at least \$75,000.

ANOTHER LARGE SAVING

Another case may be cited of a company which has standardized on a certain size and design of shaft, using uniform sizes, skips and cages. Electric locomotives and cars are also standardized. In 1921, in one district, two mines were closed and abandoned, and the locomotives, tramcars and timber trucks were all taken over and put in use by other mines of the same company without alteration and without complicating existing equipment. The skips and cages will be available when needed for new installations. In this case, there was a saving of more than \$20,000 in cost of equipment at a time when cash was not readily available. Numerous other examples of a similar character could be cited where the equipment from a property that had closed down was transferred to a new mine at considerable saving in cost.

Although standardization in haulage equipment is particularly advantageous, yet in this part of mining-work the greatest diversity of size and design exists. Anyone who has been confronted with the problem of running a mine which has several different sizes of cars and different gauges of track will appreciate the tremendous benefit to be derived from standardization. In the case of locomotives, the advantages of uniformity in size and design are apparent not only in the ease with which equipment can be transferred from one part of the mine to another and in the decrease in the amount of repair parts necessary to be kept on hand, but also in the ease with which employees can be trained for operation and the decrease in their liability to accident.

Mechanical-loading equipment is very closely allied to haulage equipment; in fact, the success of mechanical-loading depends in almost all cases on having adequate transportation. Standardization is the crying need of mechanical loading today, but it is very difficult to accomplish. This branch of the industry is in such an early stage of development and there has been such a diversity among the machines built that it seems almost impossible to effect any reasonable degree of standardization. Yet some progress has been made. Already the situation seems much more hopeful than it did a year ago. The lines of demarcation between the different types and sizes of machines have been more clearly drawn and the uses of the machines are becoming more specialized. It seems as if one of the greatest forces against which the manufacturers of mechanical-loading machinery have to fight is the feeling, probably not often realized, on the part of the mine-oper-

ators, that equipment has not been standardized, and that it would be unwise to purchase machinery now if it will be obsolete in a couple of years. Unconsciously, perhaps, the operator sets a value on standardization and hesitates to invest until he feels sure of purchasing a reasonably standardized product. As soon as standardization has been accomplished, there will be a great increase in the sale of mechanical-loading equipment, and this sort of machinery will become as well recognized as a part of the mine's equipment as power-drills and locomotives now are.

In the design and use of scrapers greater progress has been made along the lines of standardization than with any other class of loading machinery. In the mines of the copper country of Michigan, there is very little variation in the design and dimensions of the scrapers used by the different companies, and, although the hoists used are of several makes, they are all of suitable power and speed. Similar progress has been made in the soft-ore mines of the Iron Ranges, where all scrapers are of practically the same capacity, though differing somewhat in design. The hoists used are all of practically the same size and power, and have the same arrangement of drums. More progress has been made in the use of these machines in a year since they were standardized than in two years before. I think I am safe in saying that the same equipment would cost at least 50 per cent more than it does now if it had not been standardized. In one district one company is using, or has ordered \$50,000 worth of scraper-outfits. Standardization has, therefore, saved them \$25,000 in the item of first cost in this one instance.

STANDARDIZATION AND LABOR

With the exception of the year 1921, ever since the beginning of the World War there has been an adequate labor supply for the metal mines of the country, and this has been especially true in regard to skilled miners. New men have to be trained to take the places of the former miners, and it is of the greatest importance that these unskilled men should be taught quickly and cheaply the most essential parts of their duties, in order that their efficiency may be maintained and their safety assured. Nothing has aided more in the attainment of this end than a standardization of mining equipment and of methods of mining. Great progress has been made along these lines by many of the larger mining companies of the western states, and a large saving has been effected. If the same degree of standardization could be attained by the industry as a whole, general efficiency would be largely increased and the resulting saving would be enormous, amounting to millions of dollars yearly.

MINING BUREAU AIDS IN MOVEMENT

Agency Cooperates With Bureau of Standards in Developing Material Used as Basis of Standards for Mining Industry.

ACTIVITIES of the Bureau of Mines naturally contribute to the standardization movement in the mining industry by reason of that portion of a law under which the bureau operates directing that its province and duty be "to make investigations and disseminate information with a view to improving conditions in the mining,

cutting mining costs if the metal mined must, as a practical matter, be thrown out in the mill or smelter. So it comes that the bureau's waste-prevention work deals not only with the recovery of metals from ores, but also with the practices involved in the practices of melting, alloying, foundering and rolling and fabricating.



The Pittsburgh Station of the Bureau of Mines, where scientists constantly are engaged in major investigations and experiments of benefit to the mining industry

quarrying, metallurgical and other mineral industries, safeguarding life among employes, preventing unnecessary waste of natural resources and otherwise contributing to the advancement of these industries."

A TANGIBLE BENEFIT

While the bureau does not operate as a standardizing body, its investigations seeking to provide for the industry the most efficient and economical means of operation provide a tangible assistance in the setting of standards, and its mine safety work actually does act as a standardizing influence by reason of its authority to dictate permissible explosives, breathing equipment and lamps.

The bureau works to increase the efficiency of existing processes by reducing the costs and thus making possible the use of lower grade ores and to prevent waste which takes place in the recovery of metals from ores.

Since the organization of industry dealing with the major metals has been such that mining the ore, dressing or refining it, and reducing it to metals or alloys is done in the main by the same industrial units, the bureau carries its waste-prevention work through the various processes that follow the actual mining. It is pointed out by officials of the bureau that there is no possible benefit to be gained in increasing production and

Beyond this the bureau concerns itself intimately with the devising of new processes which have for their object the same purposes outlined in connection with the efforts to improve existing methods. Another phase of the bureau's activities having a direct influence upon the establishment of standards in mining is found in cooperative work carried on with the Bureau of Standards in numerous investigations such as that now under way on drill steel.

The staffs of the two bureaus supplement each other in their knowledge of the subject and cooperate in the field and laboratory, interim reports on the investigation going out under the joint signature of the two directors.

Officials of both bureaus realize that there is a zone for each must do metallurgical work which, on paper, would permit duplication. For example, the Bureau of Standards carries its investigations along the lines of physical metallurgy and concerns itself with fabricated metal. In its work of this character it must at times prepare metals or alloys in order to make intelligent tests of various compositions. On the other hand, the Bureau of Mines must at times, of equal necessity, make tests of fabricated metals, in other words enter into the realm of physical metallurgy, in order that it may proceed with accuracy in

studying conversion of metals into fabricated products. Diligent efforts are made by both bureaus to avoid any possible duplication, with the result that there is very little, if any, overlapping of work.

WAR MINERALS RELIEF CLAIMS DECIDED

THE indicated action has been taken on the following claims by the War Minerals Relief Commission and the Secretary of the Interior during the period February 16 to March 21, 1923:

RECOMMENDATIONS FOR AWARDS (Approved by the Secretary)

Northern Minnesota Ore Co., Deerpwood, Minn., additional award of \$47,072.70; Thomas A. McGrath, et al, Boulder, Colo., \$2,714.50; Edward Wagner, Wheeling, W. Va., \$9,342.23; George Pedro & William Pedro, Sonora, Cal., \$265.90; United Tungsten Copper Mines, Los Angeles, Cal., \$6,515.87; Barnum Hughes Co., Etna Mills, Cal., \$428.63.

Wills Brothers Co., Philipsburg, Mont., \$1,834; James E. Larsen, Burntranch, Cal., \$692; W. K. M. Gilkey, Marion, N. C., \$640.17; A. C. Wilcox, Morristown, N. J., \$17,679.29; Charles J. Varozza, Latrobe, Cal., \$75; John D. Moran, Seattle, Wash., \$2,450.65; Trask, Coffey & Stone, Paxton, Cal., \$1,302.70; F. J. Abbott, Los Angeles, Cal., \$6,732.35.

(Pending with Secretary)

E. W. Zibbell, Oroville, Wash., \$2,367.79; I. N. Blair and George M. Newmyer, Boulder, Colo., \$2,131.14; Dr. E. I. Krebs, San Francisco, Cal., \$692; M. E. Martin, Red Lodge, Mont., \$725; T. R. Mills and E. B. Crisman, Tehama County, Cal., \$1,153.19; Gustave T. Pinson, Prairie City, Ore., \$488; Craig, Creighton & Graham, Phoenix, Ariz., \$2,961.71; N. B. Ringeling, Philipsburg, Mont., \$2,623.35; Arthur Caywood, Boulder, Colo., \$476; Turner & Butler, Berkeley, Cal., \$378.26; H. F. Bowers, Atlantic City, N. J., \$4,461.66.

RECOMMENDATIONS FOR DISALLOWANCE

Radcliffe & Cline, Denver, Colo., no stimulation and property not of commercial importance; John C. Evanis, Sacramento, Cal., no loss shown; Wanakah Syndicate, Syracuse, N. Y., no stimulation and no authorized expenditures shown; Liberty Manganese Co., Independence County, Ark., property not of commercial importance; National Manganese Co., Oklahoma City, Oklahoma, no additional award; Tedoc Co., San Francisco, Cal., losses not within the act.

BUREAU OF STANDARDS PERFORMS YEOMAN SERVICE

IT MAY BE stated as an axiom that the Bureau of Standards encourages the organization and growth of any other agency, whether it be public or private, which has among its objects progress or improvement in the standardization field.

This standardization field is of practically unlimited extent, and each one of the numerous organizations in the country concerned with the subject has some particular portion which it wishes to cultivate. Insofar as its facilities admit, the Bureau of Standards is ready at all times to work in harmony with, and when desired in cooperation with, all movements looking toward the improvements of standards, and the methods of standardization.

There are few, if any, aspects of the development of standards and specifications, at least concerning matters related in any way to various branches of engineering, in which the Bureau of Standards cannot be of some use.

The Bureau of Standards recognizes that the field of standardization is a very extensive one, and the functions of the bureau may be briefly stated as the development, construction, custody, and maintenance of reference and working standards and their intercomparison, improvement, and application, in science, engineering, industry and commerce. For convenience the bureau groups standards into five classes:

1. Standards of measurement, which includes reference and working standards for measurements of all kinds for expressing the quantitative aspects of space, time, matter, energy, motion, and their interrelations as illustrated by length, area, volume, mass, density, pressure, thermal, electrical and other physical measurements which have for their purpose to aid accuracy in industry, assist commerce in size standards, promote justice in daily trade, and facilitate precision in science and technologic research.

THE NATURAL STANDARDS

2. Standard constants or what we may call natural constants or the measured numerical data represented by fixed physical constants such as mechanical equivalent of heat, melting and boiling points, heats of combustion, electro-

chemical and atomic weights and the like, which we have as an exact basis for study, experiment, computation and design, furnish as efficient control for industrial processes in securing reproducible and uniformly high quality and output, to secure uniformity of practice in instruments and tables and aid laboratory research by reducing errors and un-



An air-view showing the extensive grounds and buildings of the Bureau of Standards, located on the outskirts of the nation's capital

certainly caused by the use of data of doubtful accuracy.

3. Standards of quality, which are illustrated by specifications for materials used in engineering, which fix in measurable terms a property or group of properties for determining the quality in question, securing high utility in the products of industry by stabilizing the standard of quality, furnishing a scientific basis for fair dealing, avoiding disputes or providing means to settle questions, promoting truthful branding and advertising as well as precision and the avoidance of waste.

4. Standards of performance or specifications of operative efficiency or action for machines and devices.

5. Standards of practice such as codes and regulations impartially analyzed and formulated after study and experiment into standards of practice for technical regulations of construction, installation, operation.

OUTLINES VIEWS ON COAL SITUATION

New York, March 12, 1923.

Mr. J. F. Callbreath,
Sec'y, American Mining Congress,
Dear Mr. Callbreath:

This is to tell you that I liked your editorial entitled "The Real Issue," in the MINING CONGRESS JOURNAL for March.

If the true facts can be brought home to the American people, so that they will thoroughly understand them, they will have no real difficulty in arriving at a solution of the coal problem.

Coal in the ground that isn't going to be used for centuries or thousands of years is not "property" and has none of the attributes of "property." In private hands it is a liability and not an asset; that is the root of the trouble in the coal industry.

I notice that George Cushing in his interesting article in the same issue puts a valuation of 35 billion dollars on the coal in the ground. That figure he has arrived at, I assume, by taking the 3,500 billion tons, given by the statisticians as the reserves in this country, at 1 cent a ton. This is a ridiculous price and I am rather surprised at Mr. Cushing. The greater part of this coal will have cost the owners hundreds of dollars a ton before it will ever be used, if they figure

its present value at 1 cent a ton; interest on 1 cent a ton would double it every ten years. All of the coal in the ground isn't worth an average at the present time of one mill a ton. Some of the coal, of the highest quality, in bonanza seams, located favorably with respect to transportation, is valuable, but this is but a small percentage of the total. My estimate of two billion dollars as the value of the coal in the ground was arrived at by figuring a fair royalty charge per ton on the present output.

The rapidly increasing development of water power, the increasing economy in the utilization of coal through the development of very large and efficient steam power units, the rapidly increasing use of fuel oil, which, as a by-product of gasoline, is becoming more and more plentiful, and the discovery of processes by which oils in practically unlimited quantities can be distilled by low temperature distillation from high volatile coals and shales at surprisingly low costs, probably not to exceed \$1.50 per barrel of 42 gallons, a large part of which is light oil ranging from 50 to 60 degrees Baume, are all raising troublesome problems for the coal owner and operator.

Very sincerely yours,

CHARLES E. HELLIER.



NATIONAL LEGISLATION

By E. H. PULLMAN

When on March 4 the 67th Congress ended by constitutional limitation, it developed that the greatest flood of legislative proposals ever considered by a Congress, which has a duration of two years, beginning and ending on March 4 in odd numbered years, was considered. The records show that nearly 20,000 bills of various import were introduced by individual members of the House and Senate, covering all forms of legislative proposals but that only 931 received congressional approval and enactment into law by signature of the President of the United States. Of these laws, however, only 655 were of a public nature, the others being private bills for payment of pensions and claims.

The last Congress broke all records for its continuous sessions, being in almost constant session during its two years of existence. The first session began April 11, 1921. It recessed from August 24 to September 21 and adjourned on November 23. The second session began December 5, 1921, recessed from June 30 to August 15, 1922, and adjourned on September 22, 1922. The third session began November 20, 1922, and ended December 4, 1922. The fourth session began December 4, 1922, and ended March 4, 1923.

TARIFF AND REVENUE REVISION

The outstanding accomplishment of the Congress was the revision of customs tariff and internal revenue laws, the former being increased to provide additional government revenue and to protect American industries, including many in the mining field from destruction by importation of products from foreign countries produced by cheap labor, and the latter revised downward in order to relieve business and the individual from burdensome income tax levies. The mining industry was also affected favorably by several other enactments of Congress. Of chief importance perhaps was the act liberalizing the war minerals relief law, which enabled the War Minerals Relief Commission to pass on meritorious claims of mineral producers which had been barred by a restricted interpreta-

tion of the original war minerals relief law. The mine assessment law was changed so as to permit mine assessment work to be performed on claims during the year ended June 30 instead of December 31, as had heretofore prevailed, which legislation removed hardships incident to performing assessment work during the winter when climatic condi-

It had been contemplated that the subject should be investigated by a joint commission of the House and Senate but the House passed the bill with amendments at too late an hour in the closing days of the session to permit of its final enactment. The Senate thereupon authorized its special committee to conduct an inquiry.

COAL PROPOSALS

Although a flood of bills were introduced on the coal question, ranging from uniform coal contracts to government operation of mines in emergency, no coal legislation was enacted. Congress instead, authorized an extensive investigation of the coal industry costing \$600,000, to be made by a special coal commission which is to report in September and its recommendations will probably be considered by the new Congress convening in December. Because of the miners' strike extending over a period of five months last year, creating the greatest shortage of coal in the history of the country, Congress passed a law upon recommendation of the President in a special message, creating a Federal Fuel Distributor with powers to regulate distribution and price of coal, and authorizing priorities and embargoes by the Interstate Commerce Commission. The operations of the Federal Fuel Distributor were limited by law to meet this emergency. Continuance of the government in the coal business was authorized by Congress in a bill for the acquisition of land now leased for the government fuel yards in the District of Columbia. This agency, which functions under the Bureau of Mines, purchases and distributes coal for the government departments in Washington and also analyzes and tests fuel and conducts other investigations with a view to improving the heating plants of government buildings. Its investigations were the basis of a report submitted by the bureau to the Senate for a system of establishing standards for coal to meet complaints of inferior coal.

No action was taken on several proposals to declare an embargo on the ex-

THE 67TH CONGRESS March 4, 1921, March 4, 1923

LAWS ENACTED

Public, 655

Private, 276

MEASURES CONSIDERED

Senate

Bills, 4,658; reports, 1,263; resolutions, 472; concurrent resolutions, 35; joint resolutions, 472; documents, 347.

House

Bills, 14,474; reports, 1,758; resolutions, 576; concurrent resolutions, 88; joint resolutions, 442; documents, 601; petitions, 7,542; executive communications, 1,030.

tions are unfavorable. However, appeals for relieving assessment requirements on account of depressed conditions in the mining industry were not acted on although a relief bill for this purpose was passed by the Senate.

GOLD AND SILVER INQUIRY

To meet the situation caused by depressed conditions in the gold and silver mining industries and the possibility of greater depression following the conclusion of purchases of silver under the Pittman act at \$1 per ounce which is expected to be reached early next year, the Senate authorized a special commission of five Senators to investigate the situation and report next January recommendations to relieve the situation.

IMPORTANT BILLS REVIEWED IN THIS ISSUE

MINING—

S. Res. 469: Passed by the Senate. (Gold and silver inquiry)

COAL—

S. 4160: Enacted into law. (Coal Commission)

S. 4559: By Mr. Lodge (Rep.), Mass. (Coal embargo)

H. R. 14369: By Mr. Fish (Rep.), N. Y. (Coal embargo)

S. 4447: By Mr. Walsh (Dem.), Mass. (Anthracite standards)

R. Res. 452: By Mr. Walsh (Dem.), Mass. (Anthracite standards)

S. 4649: By Mr. Walsh (Dem.), Mass. (Anthracite standards)

TAXATION—

H. R. 13775: Enacted into law. (Credits and refunds)

S. 4547: By Mr. Brookhart (Rep.), Iowa. (Corporation taxes)

S. Res. 451: Adopted by the Senate. (Tax inquiry)

H. R. 13770: Passed by the House. (Capital gains and losses)

OIL—

S. 4197: Enacted into law. (Red River leases)

portation of anthracite coal because of an unfavorable report by the Interstate Commerce Commission to an embargo.

Legislation was enacted authorizing agricultural entries on coal lands in Alaska, to permit mining on lands in Utah and for leasing for mining purposes of lands on the Fort Peck Indian Reservation in Montana.

BLUE SKY FAILED

What was regarded by the mining industry as very drastic legislation failed of enactment. Although passed by the House, the Senate did not favorably regard a bill which would have placed the issuance of stock securities under the supervision of government authorities. The legislation was opposed by mining interests in extensive hearings on the ground that it would be burdensome on smaller prospectors and otherwise retard mining development.

To meet the situation caused by the abrogation of mining leases in the Red River oil region of Oklahoma, under a Supreme Court decision, Congress passed a law authorizing the Interior Department to grant leases and permits in this region to qualified persons holding claims prior to enactment of the leasing law in 1920.

Congress also extended for one year the time in which permittees under oil and gas permits should begin drilling operations due to conditions over which permittees had no control.

A law was passed releasing from naval petroleum reservation certain lands in Louisiana which the Navy had regarded as containing oil deposits.

Congress passed a law authorizing the President to call a conference of maritime nations to consider means of preventing pollution of waters by oil. A bill passed the Senate but failed in the House which would have prevented discharge of oil which might affect coastal navigable waters.

In addition to revising the internal revenue law downward, Congress considered other tax legislation. The most important proposal was to tax securities of the federal government and states. This action was contemplated by constitutional amendment which passed the House but which did not reach a vote in the Senate. Congress passed a law amending the revenue act concerning credits and refunds, but a bill which had passed the House amending the law concerning determination of capital gains and losses was not reached in time for action by the Senate. This bill would have fixed 12½ percent as the basis for such determination.

COINAGE BILLS

Special coinage of gold and silver pieces commemorating historical events were authorized by Congress including special coinage of gold dollars in honor of President Grant; special coinage of 300,000 fifty-cent pieces each in commemoration of the 100th anniversary of the enunciation of the Monroe doctrine and in commemoration of the 300th anniversary of the settlement of the Middle States in 1624. A proposal to coin a special issue of peace dollars commemorating the close of the war failed.

A bill authorizing a special coinage issue in commemoration of President Hayes passed the House but failed in the Senate.

CHILD LABOR

A proposed constitutional amendment to forbid employment of child labor in mining and other industries was favorably reported by committees of the Senate and House but was not considered owing to the press of other legislation.

The Senate passed a bill which, however, was not reached in the House, designed to put an end to a public evil by imposing heavy fines and imprisonment on those who send threatening letters through the mails.

Although passed by the House the proposed ship subsidy bill was talked to death in the Senate, the filibuster against this measure being the most interesting debate of the session, continuing until almost its end. The bill was modified from its original form which provided for a subsidy for vessels operated by oil and steel companies. The administration does not expect to renew consideration of this bill in the next Congress but will seek to establish an American merchant marine made up of private ship lines.

Steps were taken to return to their owners alien property seized during the war, a law being enacted authorizing restoration to their owners of property not in excess of \$10,000 each.

Admission of aliens from foreign countries was restricted early in the Congress to 3 percent of aliens residing in this country in 1910, and although industrial interests urged relaxation of the law in order to secure more labor, a proposal was submitted by the House Immigration Committee to further restrict aliens by limiting their admission to 2 percent of those in this country in 1890, which was not acted on.

Development of trade by Americans in China was authorized under an act for registration of corporations to trade in that country.

COLORADO RIVER

The development of the Colorado River Basin under joint agreement of the government and the states in this region was negotiated but a bill approving the compact was not acted on pending its approval by the states affected.

Railroad passengers were benefited by a law authorizing interchangeable mileage books under which the Interstate Commerce Commission has authorized a 20 percent reduction on special books.

Although Committees of the House and Senate investigated lease offers for the

Muscle Shoals, Ala., nitrate project, no action was taken.

Legislation was enacted authorizing the settlement of debts to the United States by foreign governments on the basis of the agreement reached by the United States and England. The payment of the English debt will continue over a period of sixty-two years.

GOVERNMENT REORGANIZATION

The President submitted a report recommending reorganization of government departments which will probably be taken up when Congress reconvenes. The principal feature of this report, as affecting the mining industry, is that the Bureau of Mines is recommended to be transferred to the Department of Commerce. It is also recommended that the compilation of statistics of mineral production, now conducted by the Geological Survey, be transferred to the Department of Commerce.

The Federal Trade Commission submitted a report on calcium arsenate stating that price lists were exchanged by certain important manufacturers but that prices were not fixed by agreement.

INVESTIGATIONS

Congress was marked by many investigations, some of them acrimonious and others of a type tending to improvement of conditions. Of the first type, the impeachment charges against Attorney General Daugherty may be mentioned. This grew out of the movement of organized labor to remove Attorney General Daugherty for his activity in checking the railroad shopmen's strike. They also involved charges of failure of the Attorney General to protect government oil lands in California and to prosecute anti-trust and war fraud cases. The House Judiciary Committee, which investigated the matter, exonerated the Attorney General, which was approved by the House.

The Senate Committee on Manufactures headed by Senator La Follette, of Wisconsin, investigated the price of oil and gasoline and reported legislative recommendations to remove alleged monopoly control in the oil industry. There were numerous coal investigations, by the House Committee on Labor, the Senate Committee on Manufactures and a subcommittee of the Senate Committee on Interstate Commerce but they did not materialize any legislation, as Congress referred the whole question to the Coal Commission for investigation.

A subcommittee of the Judiciary Committee headed by Senator Shortridge, of California, conducted an extensive investigation into the dye industry but made no report.

The Senate Committee on Public Lands was unable to take up the inves-

tigation of the lease of naval oil reserves in Wyoming, but has scheduled this matter for hearing October 15.

Many bills which were introduced in the House and Senate were not acted on by committees and some of them were not considered by committees because of lack of time to reach them on the calendar.

Uncompleted legislation on the House Calendar included the following:

Government acquisition of the Cape Cod Canal.

Granting to states in which the lands are located part of royalties from naval petroleum reserves.

Paying additional wages granted employees of the Bethlehem Steel Co. by the War Labor Board.

Authorizing the Shipping Board to acquire a site on Hazzell Island, St. Thomas, Virgin Islands, for a fuel and fuel oil station.

For government collection of a fee from Indians on account of mining leases.

For the purchase and sale by the government of \$10,000,000 worth of calcium arsenate and nitrate of soda.

NEW MINES CHAIRMEN

In the new Congress there will be new chairmen of the Senate and House Committees on Mines and Mining because of the retirement of the present chairmen.

Senator Oddie (Rep., Nevada), is the probable new chairman of the Senate Committee and Representative Robison (Rep., Ky.), of the House Committee. These committees will not be appointed until Congress reconvenes.

MINING

(Gold and Silver Inquiry)

S. Res. 469. Introduced by Mr. Walsh (Dem., Mont.); passed by Senate. This authorizes an investigation of the gold and silver industry by a commission of five Senators to report January 1, 1924, on legislation to remedy existing depressed conditions. The investigation will be made by the following committee:

Senators Nicholson (Rep., Colo.), Oddie (Rep., Nev.), Gooding (Rep., Idaho), Walsh (Dem., Mont.), and Pittman (Dem., Nev.).

The committee will meet for its initial session about the middle of April. This commission was authorized in lieu of the joint commission of the House and Senate which had been originally proposed by Senator Nicholson, due to the fact that the House amended the original resolution passed by the Senate and the conference committee did not have time to adjust the amendments in order to secure its passage before Congress adjourned, March 4. The resolution as

passed by the Senate, which will be the basis for investigation, follows:

"That a Senate commission is hereby created, to be known as the Senate Commission of Gold and Silver Inquiry, which shall consist of five Senators.

"Said commission shall investigate and report to Congress on January 1, 1924, upon the following subjects:

"The causes of the continuing decrease in the production of gold and silver.

"The causes of the depressed condition of the gold and silver industry in the United States.

"The production, reduction, refining, transportation, marketing, sale and use of gold and silver in the United States and elsewhere.

"The effect of the decreased production of gold and silver upon commerce, industry, exchange and prices.

"The commission is further authorized—

"To confer with citizens, associations or corporations of foreign countries with a view to the stabilization and wider use of silver in exchange.

"To propose, either formally or informally, to the President of the United States, or the heads of the proper departments, plans for negotiations with foreign governments to the same end.

"The commission shall include in its report recommendations for legislation which, in its opinion, will tend to remedy existing conditions and shall specifically report upon the limitation of the powers of Congress in enacting relief legislation.

"The commission shall elect its chairman, and vacancies occurring in the membership of the commission shall be filled in the same manner as the original appointments.

"The commission or any subcommittee of its members is authorized to sit during the sessions, recesses or adjournments of the Sixty-seventh and Sixty-eighth Congresses, in the District of Columbia or elsewhere in continental United States, to send for persons and papers, to administer oaths, to summon and compel the attendance of witnesses, to employ a stenographer to report such hearings as may be had in connection with any subject which may be before said commission, and to employ such personal services and incur such expenses as may be necessary to carry out the purposes of this resolution; such expenditure shall be paid from the contingent funds of the Senate upon vouchers authorized by the committee and signed by the chairman."

COAL

(Coal Commission)

S. 4160. Enacted into law. This bill amends the original Coal Commission law by authorizing the commission to require sworn answers to questionnaires,

and increasing the appropriation for investigation of the coal industry from \$200,000 to \$600,000.

(Coal Embargo)

S. 4559. Introduced by Mr. Lodge (Rep., Mass.). Referred to Interstate Commerce Committee. This bill proposed to authorize the President to declare an embargo on coal, and provided as follows:

"That whenever the President shall find that the public interest requires he is authorized to declare an embargo on the exportation of coal from the United States to foreign countries; such embargo may include either anthracite or bituminous coal, or both, and may be complete or partial. Without further authority of Congress no such embargo shall continue in operation for a period of more than six months at any one time."

H. R. 14369. Introduced by Mr. Fish (Rep., N. Y.). Referred to the Committee on Interstate Commerce. This bill was similar to the foregoing.

(Anthracite Standards)

S. 4447. Reported by the Labor Committee and recommitted to the Committee on Mines and Mining. This bill proposed the establishment by the Department of Commerce of standards of size, quality and condition for anthracite coal. It was referred to the Mines and Mining Committee on motion of Senator Poin- dexter, its chairman, on the ground that that committee had proper jurisdiction and should consider the matter.

S. Res. 452. Introduced by Mr. Walsh (Dem., Mass.), and adopted by the Senate. This resolution called on the Bureau of Mines for a report as to the extent to which impurities and misgrading have been found in domestic sizes of anthracite coal; information as to the extent to which impure or misgraded anthracite coal of domestic sizes has been generally marketed to the public, and whether or not it is the opinion of the bureau that legislation should be adopted seeking to establish market grades as to the size and quality of anthracite coal shipped in interstate commerce.

The resolution was based on complaint of the marketing of anthracite of misgraded sizes and containing a large proportion of impurities, such as slate, slag and other alleged fuelless material. The Bureau of Mines was called on for a report because through it the government fuel yards purchases coal for government buildings in the District of Columbia, has inspected coal for government departments and conducted studies as to quality and sizes of market grades. The Bureau of Mines submitted a report in response to this resolution in which it recommended the enactment of a bill

authorizing it to ascertain and publish the quality and size of anthracite, which bill was introduced by Mr. Walsh, as noted in the next bill following.

S. 4649. Introduced by Mr. Walsh (Dem., Mass.). Referred to the Committee on Mines and Mining. This bill would authorize the Bureau of Mines to ascertain and publish the quality and size of anthracite coal shipped, or offered to be shipped in interstate commerce, and to establish with appropriate tolerances government market grades with designations for each and to register and publish shippers' grades defined in terms acceptable to the bureau. After September 1, 1923, it was proposed that no anthracite coal shall be shipped in interstate commerce unless the bill of lading be accompanied by a certificate from the shipper, made in due form as prescribed by the Bureau of Mines, giving the government or registered grade to which such coal belongs. Violation of the act or false statement in the certificate was defined as a misdemeanor subject to a fine of not exceeding \$200 for the first offense and for each subsequent offense not exceeding \$300, or imprisonment for not exceeding one year, or both.

TAXATION

(Credits and Refunds)

H. R. 13775. Enacted into law. This law amends the revenue law in respect to credits and refunds. It provides that a claim for credit or refund arising under income, war profits and excess profits tax returns for 1917 may be filed either within six years from the date the return was due or within two years from the time the tax was paid, provided the taxpayer has, within five years from the time the return was due, filed a waiver of his right to have the taxes for 1917 assessed within five years from the date the return was due. The amendment also provides that a taxpayer may file suit for recovery of internal revenue taxes within two years from the disallowance by the Commissioner of Internal Revenue of his claim therefor.

(Corporation Taxes)

S. 4547. Introduced by Mr. Brookhart (Rep., Iowa). Referred to the Finance Committee. This bill proposed to amend section 230, revenue law, by reinvoking for the years beginning with 1917 the following taxes on net income of corporations: Ten percent on not exceeding \$20,000, 20 percent on not exceeding \$100,000, 30 percent on not exceeding \$200,000, and 50 percent on incomes in excess of \$200,000.

(Tax Inquiry)

S. Res. 451. Adopted by the Senate. This resolution directs the Federal Trade Commission to investigate and compile

data concerning the total amount of the chief kinds of wealth in the United States, including land, improvements, movables and other tangible and intangible goods, and also the ownership thereof and the various liabilities incumbent thereon, including public and private debts of various kinds, corporation stocks, and other choses in action; and to make inquiry into and compile data concerning the amount of the annual increase in national wealth in recent years in different lines of economic activity and of the income received by different classes of the population, including data as to the amount of the income from securities exempt from taxation under the federal income and profits taxes; and to make report as soon as practicable. No information shall be reported or published which would reveal the amount of wealth, property, indebtedness or income of any person, partnership or corporation.

The resolution was based on the fact that the public debts of the United States and of the several states and their political subdivisions, many of which are exempt from taxation, have reached enormous proportions of the total wealth of the country; and many of the agricultural, manufacturing and other industries or trades of the country are suffering from heavy indebtedness and from burdensome taxation; and the situation as to international debts in relation to the revival of productive enterprise throughout the world presents a problem of great complexity, and a general accounting with regard to the economic position of this country is necessary in order to formulate an intelligent policy.

The commission shall present tables to show, by states, the aggregate taxes levied by municipalities and by other local taxing bodies and by the states for the last completed fiscal year and for the corresponding fiscal year five years ago.

(Capital Gains and Losses)

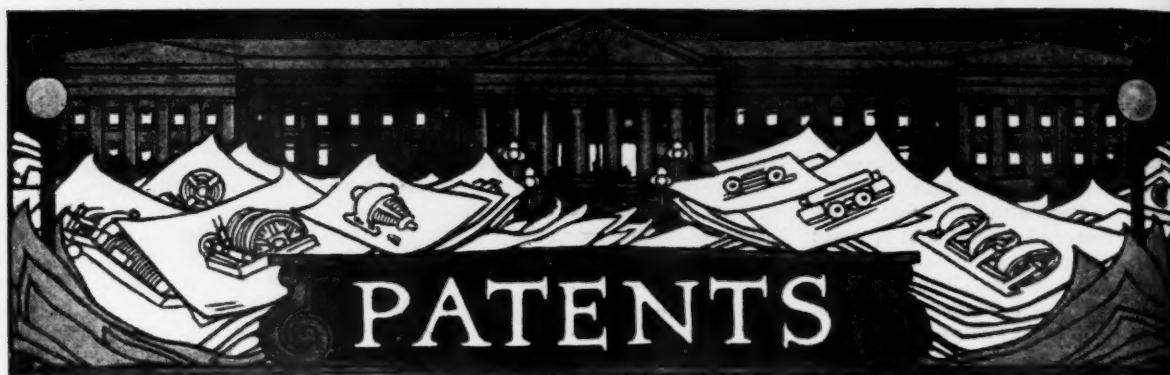
H. R. 13770. Passed by the House. Failed of action by the Senate. This bill proposed to fix 12½ as the basis for determining allowances for capital gains and losses under the internal revenue law.

OIL

(Red River Leases)

S. 4197. Enacted into law. This bill authorizes the Interior Department to issue to persons and corporations permits and leases to lands south of the medial line of the main channel of the Red River in Oklahoma.

This bill was occasioned by the Supreme Court decision which invalidated oil holdings in this territory on the ground that the land was not subject to entry under the mining law.



1,437,515—*E. B. Hack*, London, England, December 5, 1922.

"STAMP BATTERY" having lifting means for the pivoted hooks combined with means for engaging said hooks with the lugs on the stems in such a manner that they can be simultaneously operated by a single controlling device.

1,437,526—*N. D. Levin*, Columbus, Ohio, assigned to Jeffrey Manufacturing Company, December 5, 1922.

MINING AND LOADING MACHINE comprising a main frame, a conveyor mounted thereon adapted to enter a horizontal undercut in the coal, a cutter mounted on the main frame and movable longitudinally thereof adapted to form an incision in the coal, and means within the bounding planes of the cutter to exert pressure transversely thereof to dislodge the coal above the conveyor.

1,437,669—*W. F. Martin*, Wormleysburg, Pa., December 5, 1922.

COAL SCREENING AND WASHING MACHINE having means for continually pulsating the movable sides of the several pockets which receive the waste material washed through the screen. By thus pulsating the pocket sides, the waste material and water flowing into the pocket is continually agitated, so that whenever the pockets are in open position they will fully discharge their contents, thereby preventing any undesirable accumulation which has been found to occur when screening certain forms of materials with the patented machine.

1,438,125—*W. F. Martin*, Harrisburg, Pa., December 5, 1922.

COAL SCREENING AND WASHING MACHINE having a plurality of collecting pockets beneath the screen and having a discharge opening, rock shafts in said pockets, agitators carried by the rock shafts and means for simultaneously oscillating all the rock shafts.

1,438,126—*W. F. Martin*, Wormleysburg, Pa., December 5, 1922.

SELF-DUMPING SCREENING AND WASHING MACHINE having a plurality of pockets beneath said screen and each having a dumping section, means for imparting movement to said dumping section, including a rock shaft and means for holding the rock shaft against rotation in one direction with the dumping section in a closed position.

1,438,435—*H. E. Frederick*, San Francisco, Cal., December 12, 1922.

FLOTATION PROCESS using a flotation agent consisting of an acridine constituent.

1,438,436—*H. E. Frederick*, San Francisco, Cal., December 12, 1922.

FLOTATION PROCESS using a flotation agent consisting of a hydroxy acid com-

CONDUCTED BY JOHN BOYLE, JR.

pound and a nitrogen-cyclo compound in substantially neutralizing proportion.

INDUSTRIAL NOTES

The Charter Gas Engine Company, Sterling, Ill., announces its purchase of the oil engine business of the August Mietz Corporation, of New York City, manufacturers of the "Mietz and Weiss" and "Mietz" Semi-Biesel oil engines, of which the number in use totals 375,000 horsepower.

E. I. du Pont de Nemours and Company has issued a folder containing charts giving valuable data for mining engineers on flexible tubing for ventilation purposes. The tables, charts and resistance data are based on the best reports obtainable. It is announced that the charts are available on request to the company.

THE PETROLEUM REGISTER—

Standard reference book and directory of the petroleum industry, issued annually by the publishers of Oil Trade Journal, New York, now is available in its latest form. A new typographical arrangement has been adopted allowing condensation of 25 percent more information than has been included previously. Despite the increased amount of material, the book has been brought down to a smaller and more easily handled size.

PERSONALS

Arthur Notman announces the opening of his office for consulting work in mining, engineering and geology at 170 Broadway, New York.

R. V. Norris, consulting engineer, Wilkes Barre, Pa., has taken his son, R. V. Norris, Jr., in as junior partner, the firm to hereafter be known as R. V. Norris and Son. The junior member of the firm is a graduate of Yale, Ph. B., and Columbia School of Mines 1917, E. M. Since graduating he has been assistant colliery superintendent and later mining engineer for the Lehigh Coal and Navigation Co., and junior and senior accountant in Los Angeles.

An authoritative English translation from the Spanish of "El Arte de los Metales," an early work on metallurgy by Alvaro Alonso Barba, has been placed on the market by John Wiley and Sons, Inc., New York. The translation is by Ross E. Douglass and E. P. Mathewson, and was made from a Madrid reprint of 1729.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

OF THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for April, 1923.

City of Washington,
District of Columbia, ss.:

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared E. Russell Coombes, who, having been duly sworn according to law, deposes and says that she is the business manager of THE MINING CONGRESS JOURNAL, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

Name of Publisher—The American Mining Congress.

Postoffice address—Washington, D. C.
Editor in chief—J. F. Callbreath.

Editor—Ira L. Smith.
Business Manager—E. Russell Coombes.

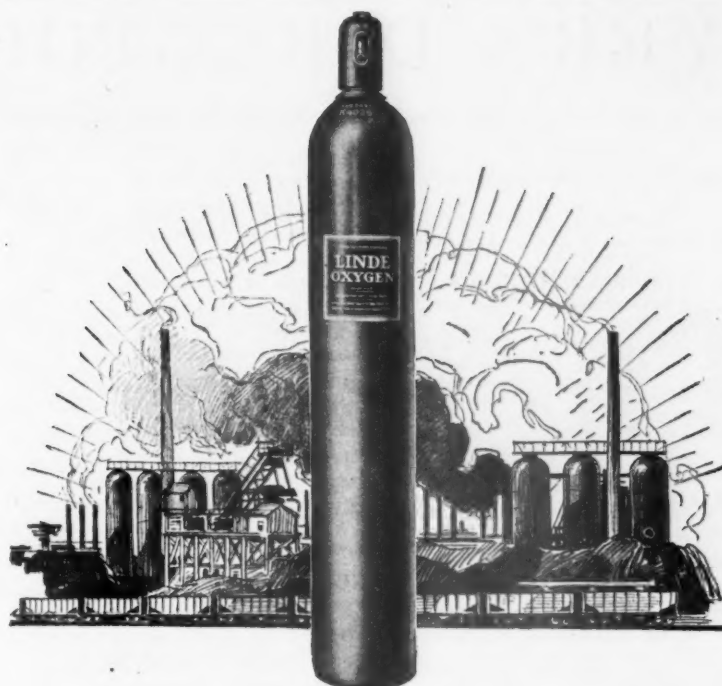
2. That the owners are (give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 percent or more of the total amount of stock): The American Mining Congress—a corporation, not for profit. No stockholders.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are (if there are none, so state): None.

E. RUSSELL COOMBES,
Business Manager.

Sworn to and subscribed before me this 28th day of March, 1923.

(Seal.) THOMAS C. WILLIS.
(My commission expires Jan. 10, 1927.)



The Scope of Linde Service

Linde Service goes beyond the mere supplying of its products. It includes a carefully planned method of bringing engineering advice and assistance into close touch in the field with the individual user's problems and needs.

Linde thus offers its customers the fruits of practical experience gained by its Service Engineers through their intimate contact with the use and development of the Oxy-Acetylene process.

Through 18 District Sales Offices Linde places its Service

within convenient reach of every Linde user.

The growing chain of Linde Distributing Stations and District Sales offices is the logical development of Linde's desire to give its patrons every facility and service in the use of Linde products.

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The Largest Producer of Oxygen in the World

Carbide and Carbon Building, 30 East 42d St., New York City

31 plants—58 warehouses

District Sales Offices:

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Detroit
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Milwaukee

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New York
Philadelphia

Pittsburgh
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Seattle
St. Louis

LINDE OXYGEN

BUYER'S DIRECTORY

ACID, SULPHURIC

Irrington Smelting & Refining Works, Irvington, N. J.

AERIAL TRAMWAYS

American Steel & Wire Co., Chicago and New York.

AERIAL TRAMWAY CABLE

Williamsport Wire Rope Co., 1201 Peoples Gas Bldg., Chicago, Ill.

AIR COMPRESSORS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

ALTITUDE VALVE

Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh, Pa.

AMALGAMATORS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

APPLIANCES, ENGINEERING

Lunkenheimer Co., Cincinnati, Ohio.

ARMATURES

General Electric Co., Schenectady, N. Y.

ASSAYERS

Pennsylvania Smelting Co., Pittsburgh, Pa.

AUTOMATIC CAR CAGERS

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

AUTOMATIC COAL SKIP

Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

AUTOMATIC (Mine Doors, Truck and Electric Switches)

American Mine Door Co., Canton, Ohio.

BAROMETERS

Taylor Instrument Companies, Rochester, N. Y.

BATTERY-CHARGING EQUIPMENT

General Electric Co., Schenectady, N. Y.

BELTING (Conveyor, Elevator, Transmission)

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

BELTING, SILENT CHAIN

Morse Chain Co., Ithaca, N. Y.

BINS (Coke and Coal)

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

BIT SHARPENERS

Denver Rock Drill Mfg. Co., Denver, Colo.
Ingersoll-Rand Co., 11 Broadway, New York City.

BLASTING POWDER

Hercules Powder Co., 934 King St., Wilmington, Del.

BLASTING SUPPLIES

du Pont Powder Co., The E. I., Wilmington, Del.
Hercules Powder Co., 934 King St., Wilmington, Del.

BLOWERS

General Electric Co., Schenectady, N. Y.

BLOWERS' CENTRIFUGAL

Ingersoll-Rand Co., 11 Broadway, New York City.

BOILER MOUNTINGS

Lunkenheimer Co., Cincinnati, Ohio.

BOILER STOP AND CHECK VALVE

Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh, Pa.

BOILERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis. (feed pump).

BOXES, JOURNAL

J. R. Fleming & Son Co., Inc., Scranton, Penna.

BREAKERS (Construction and Machinery)

Jeffrey Mfg. Co., Columbus, Ohio.
Vulcan Iron Works, Wilkes-Barre, Pa.
Wilmot Engineering Co., Hazleton, Pa.

BRIQUETTING MACHINERY

Jeffrey Mfg. Co., Columbus, Ohio.
Traylor Eng. & Mfg. Co., Allentown, Penna.

BUCKETS (Elevator)

Jeffrey Mfg. Co., Columbus, Ohio.

CABLES (Connectors and Guides)

American Mine Door Co., Canton, Ohio.

CABLEWAYS

Jeffrey Mfg. Co., Columbus, Ohio.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.

CAGE (Safety Appliances)

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

CAGES

Car-Dumper & Equipment Co., Chicago, Ill.
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Holmes & Bros., Robert, Inc., Danville, Ill.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.

CAR CONTROL AND CAGE EQUIPMENT

Car-Dumper & Equipment Co., Chicago, Ill.

CAR DUMPS

Car-Dumper & Equipment Co., Chicago, Ill.

CAR AND CAR WHEELS

Hockensmith Mine Car Co., Penn Station, Pa.

CAR-HAULS

Car-Dumper & Equipment Co., Chicago, Ill.

CASTINGS

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

CHAINS

Jeffrey Mfg. Co., Columbus, Ohio.
Morse Chain Co., Ithaca, N. Y.

CHAINS, AUTOMOBILE ENGINE

Morse Chain Co., Ithaca, N. Y.

CHAINS, DRIVE

Morse Chain Co., Ithaca, N. Y.

CHAINS, FRONT END

Morse Chain Co., Ithaca, N. Y.

CHAINS, OILING

Morse Chain Co., Ithaca, N. Y.

CHAINS, POWER TRANSMISSION

Morse Chain Co., Ithaca, N. Y.

CHAINS, SILENT (Rocker-Joint)

Morse Chain Co., Ithaca, N. Y.

CHAINS, SLING

Morse Chain Co., Ithaca, N. Y.

CHAINS, SPROCKET WHEEL

Morse Chain Co., Ithaca, N. Y.

CHEMICALS

Roesler & Hasulacher Chemical Co., 709-717 Sixth Avenue, New York.

CHEMISTS

Hunt, Robt., & Co., Insurance Exchange, Chicago, Ill.

CIRCUIT BREAKERS

General Electric Co., Schenectady, N. Y.

CLAMPS (Trolley)

Ohio Brass Co., Mansfield, Ohio.

CLUTCHES

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

COAL COMPANIES

Clinchfield Coal Corp., Dante, Va.
Lehigh Coal & Navigation Co., Philadelphia, Pa.
Stonea Coal & Coke Co., Philadelphia, Pa.
Thorne, Neale & Co., Philadelphia, Pa.
Wholesale Coal Co., Pittsburgh, Pa.

COAL CRUSHERS

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Jeffrey Mfg. Co., Columbus, Ohio.

COAL CUTTERS

Goodman Mfg. Co., Chicago, Ill.
Jeffrey Mfg. Co., Columbus, Ohio.

COAL DRYING PLANTS

Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL HANDLING MACHINERY

Jeffrey Mfg. Co., Columbus, Ohio.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL MINING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Goodman Mfg. Co., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Jeffrey Mfg. Co., Columbus, Ohio.
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL MINE POWER PLANTS

Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL MINING PLANTS

Ingersoll-Rand Co., 11 Broadway, New York City.
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL WASHING PLANTS

Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COCKS (Locomotive, Cylinder and Gauge)

The Lunkenheimer Co., Cincinnati, Ohio.

COILS (Choke)

General Electric Co., Schenectady, N. Y.

COMPRESSORS, AIR

General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York City.

COMPRESSORS, MINE CAR

Ingersoll-Rand Co., 11 Broadway, New York City.

CONCENTRATORS (Table)

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

CONCRETE REINFORCEMENT

American Steel & Wire Co., Chicago and New York.

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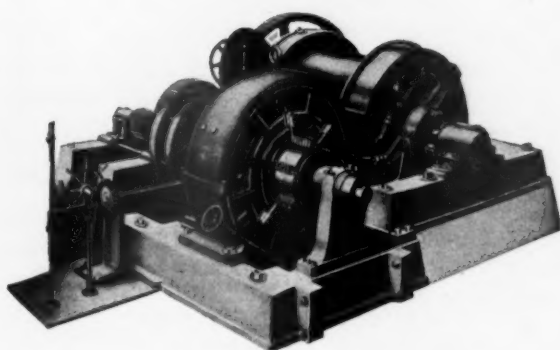


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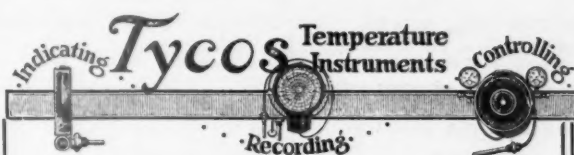
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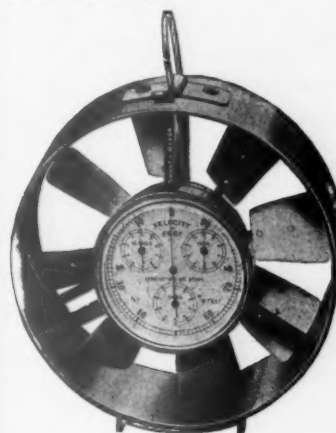


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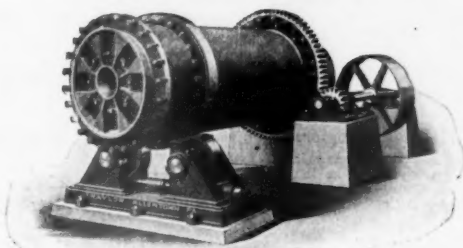
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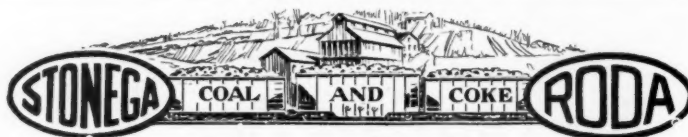


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INDEX TO ADVERTISERS

Allis-Chalmers Mfg. Co.....	26	Lehigh Coal and Navigation Co.....	41
Ameling Prospecting Co., H. R.....	39	Leschen and Sons Rope Co., A.....	26
American Cyanamid Co.....	4	Lidgerwood Mfg. Co.....	20
American Mine Door Co.....	37	Linde Air Products Co.....	33
American Steel and Wire Co.....	22	Lunkenheimer Co.....	37
American Zinc, Lead & Smelting Co.....	24	Mancha Storage Battery Locomotive Co.....	28
Anaconda Copper Mining Co.....	14	Morse Chain Co.....	18-19
Barrett, Haentjens & Co.....	16	Nason Coal Co.....	42
Bertha Coal Co.....	46	New York Engineering Co.....	22
Big Creek Coals, Inc.....	49	O'Gara Coal Co.....	43
Boyle, John.....	39	Ohio Brass Co.....	13
Byers Company, A. M.....	6	Phelps Dodge Corporation.....	39
Central Frog and Switch Co.....	27	Roberts and Schaefer Company.....	35
Chicago Perforating Co.....	39	Roebbling's Sons Company, John A.....	37
Clinchfield Fuel Co.....	46	Roessler and Hasslacher Chemical Co.....	28
Connellsville Mfg. and Mine Supply Co.....	35	S. K. F. Industries, Inc.....	31
Deming Co.....	30	Scranton Coal Co.....	43
Denver Rock Drill Mfg. Co.....	3	Sivyer Steel Casting Company.....	7
du Pont de Nemours & Co., E. I.....	29	Stonega Coke and Coal Company.....	46
Golden-Anderson Valve Specialty Co.....	10	Stonehouse Steel Sign Company.....	39
Goodman Mfg. Co.....	12	Streeter-Amet Weighing & Recording Company.....	17
Hercules Powder Co.....	23-35	Taylor Instrument Companies.....	35
Hockensmith Wheel and Mine Car Co.....	20	Thorne, Neal and Company.....	44
Hoffman Brothers.....	39	Timken Roller Bearing Co.....	32
Hunt and Co., Robert W.....	39	Traylor Engineering and Mfg. Company.....	37
Ingersoll-Rand Co.....	15	United Metals Selling Company.....	24
Ironton Engine Co.....	37	Westinghouse Electric & Mfg. Company.....	8-9
Irrington Smelting and Refining Works.....	39	West Virginia Rail Company.....	39
Jeffrey Mfg. Co.....	Cover	Wilmot Engineering Company.....	39
Keystone Lubricating Co.....	11	Wood Shovel and Tool Company.....	25

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ity.
niver-
co.
& Re-
aines-
Ray.
opper,
C.
lo

THE 26TH
ANNUAL CONVENTION

AND THE

... 41
... 26
... 20
... 31
... 37
... 23
18-19
... 42
... 22
... 43
... 13
... 39
... 35
... 37
... 28
... 31
... 43
... 7
... 46
... 39
... 17
... 35
... 44
... 32
... 37
... 21
... 8-9
... 39
... 39
... 25

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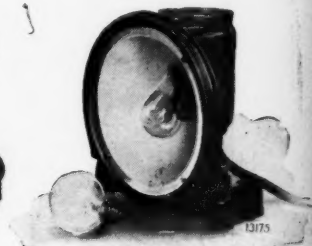
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